Investigation report

M2012-02

M/S PHOENIX J (ATG) grounding off Rauma 18.4.2012

Translation of the original Finnish language report

Onnettomuustutkintakeskus
Olycksutredningscentralen
Safety Investigation Authority, Finland

Osoite / Address:	Ratapihantie 9 FI-00520 HELSINKI	**Adress:**	Bangårdsvägen 9 00520 HELSINGFORS
Puhelin / Telefon: **Telephone:**	029 51 6001 +358 29 51 6001		
Fax:	09 876 4375 +358 9 876 4375		
Sähköposti / E-post: **Email:**	turvallisuustutkinta@om.fi sia@om.fi		
Internet:	www.turvallisuustutkinta.fi www.sia.fi		

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SUMMARY

The M/S PHOENIX J, sailing under the flag of Antigua and Barbuda, had arrived to Rauma on 17 April 2012. The vessel discharged and loaded containers and departed for Gävle, Sweden, at 12.06 on 18 April. The vessel ran aground at 12.58 and remained on a shoal. There were leakages in the bow. The vessel was refloated from the shoal by a salvage company, and she was towed to port on 22 April. The damages were inspected by the Finnish Transport Safety Agency and the classification society, and they granted the vessel permission to transfer to Germany for repairs after temporary repair measures had been completed and the cargo had been discharged.

On the voyage the Pilot disembarked the vessel before the actual pilot boarding area after agreeing on this with the Master. The disembarkation took place somewhat north of the fairway area and in this way the Pilot could transfer to the pilot boat in the lee of the wind. An inbound vessel, M/S HARBOUR FOUNTAIN, which the Pilot was to board next, had proceeded past the pilot boarding area and the Pilot decided to bring forward the transfer more than usual. The Master of the PHOENIX J lost his perception of the vessel's exact position possibly because of the manoeuvring required by the Pilot's disembarkation, in which the vessel provided lee for the pilot boat by performing a sharp turn to north. Immediately after this the Master changed the vessel's course to 254 degrees towards Gävle, but this was done too early. This heading led the vessel towards a shoal. The Chief Officer had recommended that a course of 270 degrees should be used. At the same time the VTS operator monitored the Pilot boarding the inbound vessel, which had already proceeded far and close to the southern border of the fairway, where the fairway starts to narrow. Due to this monitoring and the temporary disturbance in his display unit, the VTS operator noticed that the PHOENIX J was proceeding towards a shoal so late that the grounding could not, in spite of a warning, be avoided.

After the accident the Finnish Transport Agency in its role as authority responsible for VTS operations and Finnpilot Pilotage Ltd agreed on common practices in order to improve cooperation in the Sea of Bothnia pilot boarding area 7 May 2012. These practices render the operations clearer and thus improve the safety of vessel traffic. The objective is to improve the mutual communication and reciprocal situational awareness between the VTS and pilots.

As the result of the investigation, the Safety Investigation Authority recommends that Finnpilot Pilotage Ltd and the Finnish Transport Agency in its role as the VTS authority ensure that the procedures noted on 7 May 2012 on improving of cooperation between pilots and the VTS have been adopted in the Sea of Bothnia area and that they will be extended to cover all Finnish pilotage areas. It is recommended that Finnpilot Pilotage Ltd specify its pilotage instruction in such a way that the pilot, if the pilotage ends before the pilot boarding area, understands to indicate clearly to the master the position of the vessel and the route out past the pilot boarding area and makes sure that the master has understood the aforementioned. The Finnish Transport Agency is recommended to create and to implement automatic alarm boundaries in the fairways at places where they are considered to improve safety and also to study possibilities to specify the VTS instructions for ships in such a way that anchored ships must ask VTS for permission before departing.

The Safety Investigation Authority has made a safety observation regarding the PHOENIX J case. In the course of pilotage the master of the vessel may leave the manoeuvring of the vessel entirely to the pilot and does not adequately monitor the passage of the vessel. In addition, he/she has to monitor the disembarkation of the pilot to the pilot boat in which case the vessel may significantly diverge from the fairway and its direction. Therefore the exact position of the vessel may not be clear for the master when the pilot disembarks the vessel. The audits of the vessel and shipping company SMS performed by the Finnish Transport Safety Agency and the Maritime Administration of Antigua and Barbuda should ensure that the systems in question require that the master and the officer of the watch check, together with the pilot, the vessel's position and continued route before the pilot leaves the bridge.

TABLE OF CONTENTS

GLOSSARY OF ABBREVIATIONS AND ACRONYMS

Abbreviation/acronym	In English
AIS	Automatic Identification System
ARPA	Automatic Radar Plotting Aid
BRG	Bearing
CPA	Closest Point of Approach
EBL	Electronic Bearing Line
ECS	Electronic Chart Display
MMSI	Maritime Mobile Service Identity
ROV	Remotely Operated (underwater) Vehicle
SMS	Safety Management System
SOLAS	(International convention for the) Safety of Life at Sea
STCW-95	Standards of Training, Certification and Watchkeeping
UTC	Universal Time Coordinated
VTS	Vessel Traffic Service
TCPA	Time to Closest Point of Approach
RPM	Revolutions per minute

FOREWORD

The Safety Investigation Authority received information on the grounding of the M/S PHOENIX J off Rauma on 18 April 2012. Refloating the vessel from the shoal took a couple of days and the vessel was towed to the Port of Rauma on 22 April. An investigator visited the vessel together with representatives from the Finnish Transport Safety Agency on 24 April. The investigator obtained some documents, took photographs and was told about the course of events. On the basis of a preliminary investigation, the Safety Investigation Authority decided on 31 May to initiate a safety investigation. Lic.Sc. (Tech.) Olavi **Huuska** was appointed as the head of the investigation group and sea captain Rainer **Dahlblom** was appointed as a member investigator. Chief Marine Accident Investigator Martti **Heikkilä** was appointed as investigator-in-charge.

During the past few years many accidents and incidents have occurred shortly after the pilot has left the vessel. Therefore this investigation discusses more extensively such aspects related to the disembarkation of pilot which can lead to navigational errors and dangerous situations caused by these errors to the piloted vessel.

The flag state of the vessel is Antigua & Barbuda, and an agreement has been made with the safety investigation authority of Antigua & Barbuda that the Finnish authorities conduct the investigation of the accident and flag state authorities assist if need arises. The investigation is not a joint investigation.

The time used in the Investigation Report is the Finnish summer time (UTC+3). The time used on the vessel was UTC+2.

Statements concerning the Investigation Report. The final draft of the Investigation Report was sent on 23.7.2013 for statements to the Finnish Transport Safety Agency and the Maritime Administration of Antigua and Barbuda, Finnpilot Pilotage Ltd, the Finnish Transport Agency and the shipping company as well as the master and the pilot as prescribed in the Safety Investigation Act (525/2011). Owing to the statement of the Finnpilot Pilotage Ltd, an additional request for statements was sent to the Finnish Transport Agency and the Finnish Transport Safety Agency on 29.8.2013. The statements can be found as an Appendix to this Investigation Report. The statements have been taken into consideration when finalising the Investigation Report.

The Investigation Report is translated into English by Minna Bäckman.

Documents are archived at The Safety Investigation Authority.

1 EVENTS AND INVESTIGATIONS

The investigators have received information about and documents on the case from the shipping company, the Finnish Transport Safety Agency, the classification society, the salvage and diving company, the Finnish Meteorological Institute, West Coast VTS and Finnpilot Pilotage Ltd. The view from the vessel's navigating bridge was recorded on 27 April as a panorama shot from the places occupied at the time of the accident.

1.1 Vessel

1.1.1 General information

Owner	Schiffahrtsgesellschaft MbH&Co, Haren/Ems Germany
Operator	Jungerhans Maritime Services, Haren/Ems Germany
Year of construction	2010, Jiangdong shipyard in China
Type	Container ship
Flag State	Antigua and Barbuda
Home port	St. John’s
Call sign	V2FE2
IMO no	9504047
Length, max.	151.72 m
Breadth	23.40 m
Draught, summer	8.00 m
Deadweight, summer	12883 t
Container capacity	1036 TEU, of which 250 for refrigerated containers
Gross tonnage	10585
Net weight	5372
Speed, max.	19.0 knots
Main engine	MAK 9 M43 C, 9000 kW, 500 RPM
Bow thruster	800 kW
Classification society	Germanischer Lloyd, 100 A5 E3

Figure 1. M/S PHOENIX J aground. Photo: the Finnish Border Guard.

1.1.2 Manning

According to the vessel's manning certificate, the minimum number of crew is 13. On the accident voyage, the vessel had a crew of 15. The Master was Polish (born 1960), had acted as a master for 14 years and had experience of the particular vessel type from approx. one year. He had acted as the Master of the PHOENIX J for approx. one month. This was his first voyage to Rauma. The Chief Officer (born 1972) was from Ukraine, had acted as a chief officer for 8 years and worked on the vessel for three months. The Second Officer (born 1970) was also from Ukraine, had acted as an officer for 6 years and worked on the vessel for approx. 2.5 months. The Chief Engineer was Russian and the Second Engineer was Ukrainian. The rest of the crew were from the Philippines, Cap Verde and Russia.

1.1.3 Navigating bridge and bridge equipment

The general arrangement of the navigating bridge (Figure 2) is open and the bridge provides good visibility both forward and to the sides. There is visibilty aftwards only from the bridge wings. For navigation and manoeuvring there is a straight desk in the front part of the bridge. There are two workstations, one is for the person who manoeuvres the vessel and the other is for monitoring purposes.

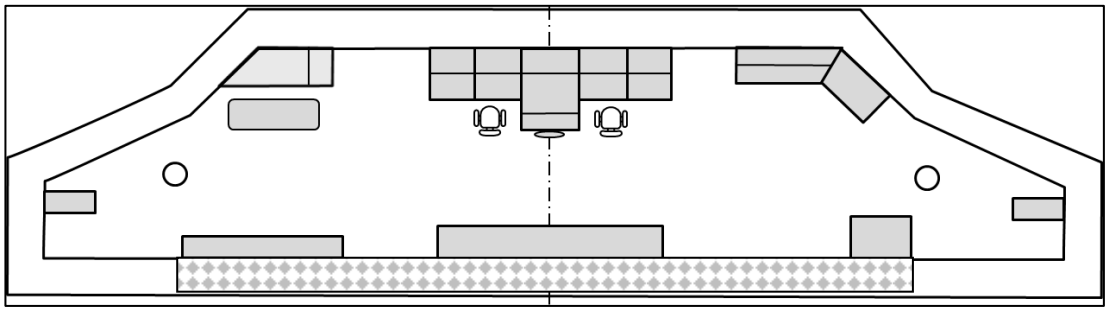


Figure 2. General arrangement of the navigating bridge of the PHOENIX J. The dotted areas offer no visibility aftwards (Figure 3).

Both workstations have their own manoeuvring consoles and screens for the radar and the ECDIS equipment.

The control equipment for e.g. the main engines, manoeuvring and VHF radios are located in the common middle console. The indicators for e.g. propeller revolutions, bow thruster power, gyro compass and anemometer can be found in the ceiling console above the desks.

Figure 3. The navigating bridge desks photographed from the starboard side on 27 April.

Navigational and communication equipment

Radar x-band (3 cm)	SAM Electronics	
ARPA display	Chartradar 1100	(* 2 units
Radar S-band (10 cm)	SAM Electronics	
ECDIS	SAM Chartpilot	(*
Magnetic compass	C.Plath	
Gyrocompass	Anschütz Std 22	(*
Speed log	SAM Electronics	(*
Echo sounder	SAM 4620	(*
Automatic steering	Anschütz Pilotstar D	
GPS receivers	SAAB R4	(* 2 units
AIS transponder	SAAB R4	(*
VHF + DSC equipment	DEBEG	(* 2 units
other GMDSS equipment	DEBEG	A3
	Inmarsat-C T&T-3020C	duplex

(*connected to the VDR device

Figure 4a. The middle console and the manual rudder in the steering column. The master was steering the vessel when she ran aground.

Figure 4b. Sensor displays in the middle console. 1 = echo sounder, 2 = gyro compass, 3 = speed log, 4 = rudder angle indicator, 5 = multi-function display.

Figure 4c. The most important steering consoles in the middle desk. 1 = engine and navigating phone, 2 = VHF+DSC, 3 = steering gear pumps, 4 = selector for manoeuvring position, 5 = automatic steering, 6 = engine power/propulsion, 7 = bow thruster, 8 = window wipers.

Figure 5. The starboard bridge wing desk and its steering console. The Master steered the vessel from here when the pilot was disembarking the vessel. An identical desk can be found on the port bridge wing.

1.1.4 Engines and the engine room

Not relevant concerning the accident.

1.1.5 Cargo situation[1]

The PHOENIX J was carrying 6383.3 tons of containers in total. There was no cargo classified as dangerous on the vessel. The vessel carried 921.8 tons of fuel and 2503 tons of ballast water; the total displacement was 15574.5 tons. When the vessel departed from Rauma, the forward draught was 6.81 m and the aft draught was 7.64 m. In addition, the stability complied with the regulations.

1.2 Accident event

1.2.1 Weather conditions

The Finnish Meteorological Institute has provided the weather, wave and water height information for the time of the accident and the rescue activities[2]. At the time of the accident, the wind was blowing from west with the speed of approx. 10–12 m/s (Figure 6). There was slight sea, the significant wave height was approx. 1 m. The visibility was good.

[1] The printout on the vessel's condition status report on 18 April 2012 at 11.38
[2] The Finnish Meteorological Institute; wind conditions in Kylmäpihlaja, water level according to the Rauma mareograph and wave estimates, emails 6–8 August 2012.

Wind interrupted the attempt to refloat the vessel on 21 April (Figure 14). Water level varied during the rescue activities (Figure 15).

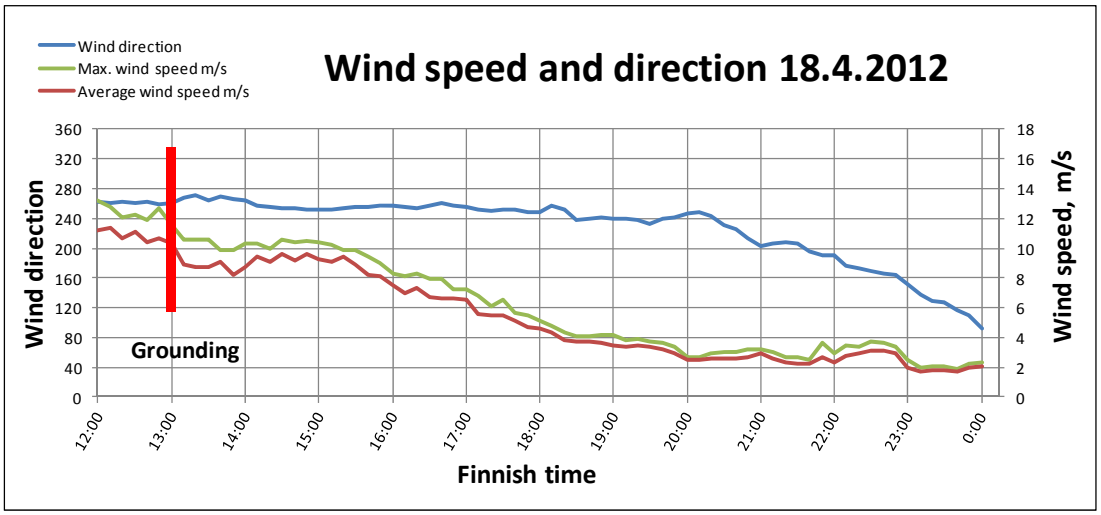


Figure 6. Wind condition in Kylmäpihlaja during the grounding, the red vertical line.

1.2.2 Starting the accident voyage

The PHOENIX J arrived from Kotka to Rauma on 17 April. After the loading operations, normal departure preparations and inspections according to the vessel-specific check-list were made. The departure draught forward was 6.8 m and aft 7.6 m. The vessel had a voyage plan[3] which had been compiled in table form and marked on a paper chart, but the route had not been entered into the electronic chart system (ECDIS). The vessel was on her way to Gävle, for which a heading of 254 degrees from the Rauma Light-house had been entered to the voyage plan (Figure 7).

The Pilot[4] had received a pilotage order from the Pilot Order Centre at approx. 10 o'clock: a vessel was departing from ro-ro-quay 7 at 12 o'clock, and one vessel was coming in. The Pilot arrived to the vessel at 11.54 on 18 April. The Pilot informed to the West Coast VTS that the PHOENIX J was heading out. The Pilot and the VTS operator confirmed from each other that the officers of the M/S HARBOUR FOUNTAIN[5], which was inbound to Rauma and waiting out at the sea, were aware of this double pilotage. The vessel was let go from the quay at 12.06. The Chief Officer took care of the manoeuvring of the vessel till the beginning of the fairway.

In the fairway the Pilot piloted using PHOENIX J's equipments. To start with, he used manual rudder and later switched over to automatic steeringThe Pilot asked the Master if he could leave the vessel before the pilot boarding area. The Master was fine with this, even though he had originally planned to leave the Pilot at the pilot boarding area. The Pilot agreed upon the route with the Master during the voyage. At this point, a turn to-wards north for leaving the Pilot was also agreed on. The vessel would thus provide the pilot boat lee from the wind.

The HARBOUR FOUNTAIN had been asked to be at the pilot boarding area "quarter to" (i.e. 12.45)[6]. The vessel called the Pilot first at 12.08 and then three times 12.15–12.16, but received no answer[7]. The Pilot agreed at 12.16 with the VTS using Finnish language that because of strong westerly wind he would board the inbound vessel from the port side[8].

The VTS operator called the HARBOUR FOUNTAIN in English at 12.17. The vessel in-formed that she had started to proceed towards the pilot boarding area. The VTS opera-tor acknowledged this and informed that the pilot ladder would be on the port side and that the Pilot was on his way to the pilot boarding area onboard the outbound PHOENIX J.

3 PHOENIX J Voyage Plan, 17 April 2012

4 The description of the pilot's action is based on his hearing on 11 September 2012.

5 Chemical tanker, length 124 m, breadth 22 m, deadweight 16909 tons, flag state Portugal, call sign CQKH

6 The VTS recording does not include this. Based on the discussion with the Pilot.

7 It is normal practice in Finland that the local pilot stations are not prepared to listen to pilot orders.

8 On this fairway area it has become a common practice to ensure the safety of the pilot by turning the outbound vessel north before the pilot boarding position in an area where there is plenty of deep water. An inbound vessel has to be turned to-wards south. There is less space on the south side of the fairway and manoeuvring the vessel there is more demanding. The practice has been motivated by using a phrase from the Pilotage Act ("if necessitated by weather or ice conditions"). In the last resort, the pilot has decided in which situation this exception is to be applied.

The Pilot contacted the HARBOUR FOUNTAIN at 12.32.30[9]. He agreed on the meeting and told that he would steer the PHOENIX J outside the northern fairway in five minutes and disembark the vessel and leave towards the HARBOUR FOUNTAIN onboard the pilot boat. In this way the vessels would meet “port to port”. The HARBOUR FOUNTAIN acknowledged this and also the Master of the PHOENIX J heard this. The HARBOUR FOUNTAIN passed the pilot boarding area at approx. 12.39 and continued without reducing speed. The VTS did not intervene with the passage of the vessel.

1.2.3 Scene of the incident

The movements of the PHOENIX J and HARBOUR FOUNTAIN at 12.34–12.58 have been compiled in Figure 7. The figure also shows the movements of the pilot boat L-241 at 12.44–12.58.

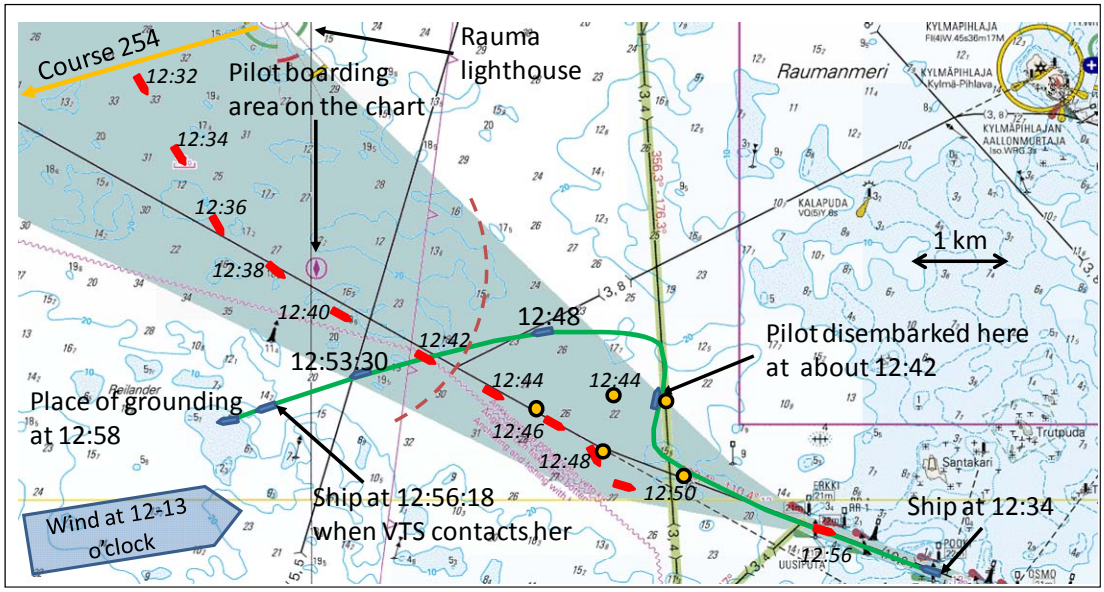


Figure 7. The accident area. The route of the PHOENIX J is indicated in green colour and it is based on the AIS data recording (VTS). Red colour has been used to indicate the position of the HARBOUR FOUNTAIN with the interval of two minutes, times in italics. The orange/black circle has been used to indicate the position of the pilot boat while it moved from one vessel to the other. The brown broken curve is in the distance of 1 Nm from the pilot boarding area. After the disembarkation of the pilot the PHOENIX J turned too early to the course leading to Gävle from the Rauma lighthouse (254 degrees).

The pilot boarding place has been marked clearly on the chart (violet diamond inside a circle). The pilot left the vessel before the pilot boarding area marked on the chart. This practice is usual in Rauma when there are strong westerly winds.

[9] In the VTS recording

1.2.4 The incident

In addition to the Pilot, the Master and the Chief Officer were on the bridge of the PHOENIX J[10]. The Pilot steered the vessel which gave way to the incoming HARBOUR FOUNTAIN by proceeding towards north, outside the fairway. After that the vessel directed its bow to north so that the pilot could disembark the vessel safely.

Before leaving and handing over the con to the Master, the Pilot still confirmed whether everything was clear and if there were any questions. He showed the vessel's position on the ECDIS chart. The Master said that everything was clear. According to the Pilot's assessment, the manoeuvring equipment of the vessel was up-to-date and in good working order. The Pilot left the bridge at approx. 12.40 when the time it took for him to get to the pilot boat is taken into account. In Figure 7 this corresponds to the moment after the vessel has turned to north. The speed of the vessel was approx. 10 knots when the Pilot transferred to the pilot boat. In the course of the disembarkation of the Pilot, the PHOENIX J proceeded 600–700 m. The Pilot left the vessel at 12.42[11].

After the Pilot had left the bridge, the Master took over the manoeuvring of the vessel. During the pilot disembarkation operation, he manoeuvred by using manual steering from the starboard bridge wing. There was no chart display or radar on the starboard bridge wing. The Master has told that he could not monitor the proceeding of the vessel and was not aware of the vessel's position during the disembarkation of the Pilot and the turn following it. The Chief Officer claims to have known the vessel's position based on the electronic chart and that he saw the green buoy.

After the Pilot had disembarked the vessel, the Master presumed that the vessel had moved too much northwards and initiated a sharp turn to west-south-west. The Chief Officer marked the route on the electronic chart by using orange colour[12]. The Master confirmed the course alteration from the Chief Officer, who recommended a heading of 270 degrees. The Master, however, eventually steered the vessel to the heading of 254 degrees.

At 12.48 the Master informed that preparations for taking the vessel to the open sea voyage would be started. All crewmembers had been allocated their own duties. The Master also issued an order to perform a safety check. The Chief Officer called Gävle, which was the next port of call. At this stage the Second Officer arrived to the bridge. When the Master noticed that the route had not been entered on the radar, he asked the officers to come to him and enquired about the draught of the vessel. The answer was 7.60 m.

The Pilot transferred on the pilot boat to the HOURBOUR FOUNTAIN at approx. 12.48[13]. After this, when the pilot boat left the vessel's side, the vessel was close to the southern edge of the fairway. The HARBOUR FOUNTAIN immediately started to move towards the navigation line.

[10] According to what the Pilot remembers, there might have been on the bridge one more person who dealt with some papers somewhat more to the side.
[11] The vessel's logbook. In the VTS recording the pilot boat leaves the vessel at 12.42.20.
[12] The route from Rauma lighthouse to Gävle pilot boarding area, course 254 degrees.
[13] In the VTS recording.

The West Coast VTS monitored the movements of the outbound PHOENIX J and the inbound HARBOUR FOUNTAIN. The VTS operator[14] monitored more closely the latter one, because the embarkation of the Pilot took place on the southern edge of the fairway area and in addition close to an edge mark, Figure 8a.

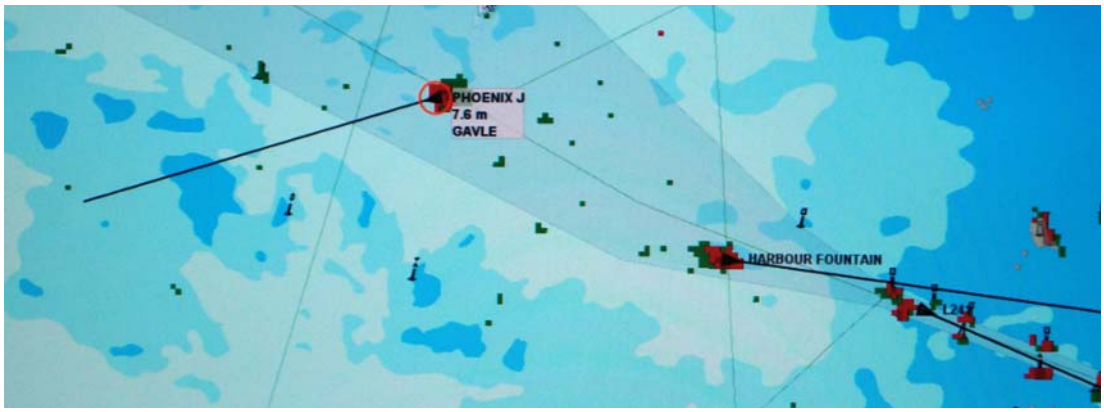


Figure 8a. The positions of the vessels and the pilot boat at approx. 12.52.

The pilot boat left the side of the HARBOUR FOUNTAIN at 12.48.20 (Appendix 1) and the Pilot informed at 12.51.32 that he was onboard the HARBOUR FOUNTAIN. The VTS operator had zoomed the display to monitor the HARBOUR FOUNTAIN, which was in the narrowing part of the fairway and approaching a narrow, dredged fairway section. The PHOENIX J could not be seen on the display. After this the VTS operator zoomed out the display outlook, which then for some time became dark. When the display was functioning again, the PHOENIX J had passed the edge of the fairway area, but it had not turned on the line leading out. The vessel was close to position from which a 5.5-metre deep fairway leads southwards, Figure 8b.

The Master of the PHOENIX J was manoeuvring the vessel by using automatic steering. The investigators have not obtained information on the settings of the automatic steering, on e.g. the limitation of the rudder angle or on angular velocity.

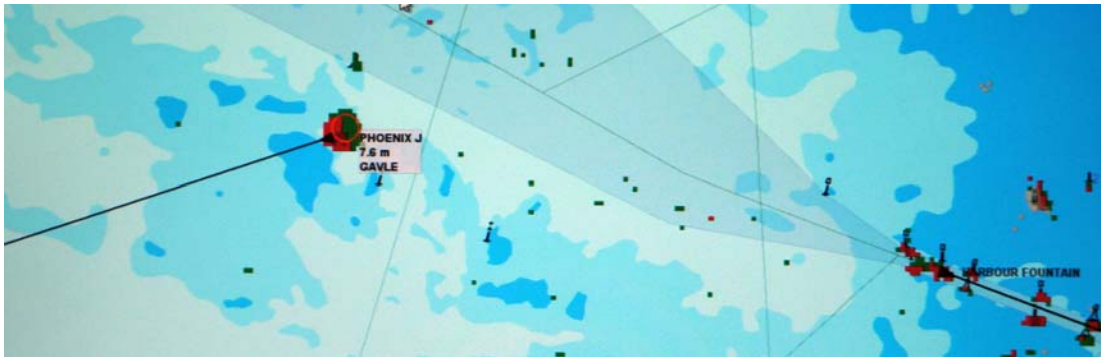


Figure 8b. The vessels' positions at approx. 12.56.

The AIS data shown on the VTS operator's display was 7.6 m for the vessel's draught, but this piece of information is not necessarily correct[15]. Therefore the VTS operator

[14] The description of the VTS operator's actions is based on an interview held on 27 September 2012.
[15] According to the West Coast VTS Operations Manual, the draught from AIS information has to be confirmed verbally.

immediately contacted the vessel at 12.56.18[16] and asked about her draught. The Second Officer, who had just arrived on the bridge, answered that the draught was 7.6 m. After receiving the answer, the VTS operator informed that the vessel was about to run aground. The conversation took approx. 1/2 minute, and one minute after the conversation had ended, at 12.58, the vessel ran aground even though the Master had turned the vessel towards port.

The VTS concluded that the PHOENIX J had stopped on a 5.2 m deep shoal, and contacted the vessel at 13.00. The Master informed that the vessel was aground. The vessel was asked to inform whether and what kind of assistance was required. The vessel was aground on the Reilander shoal, where the depth of water is mainly 5–6 m (somewhat further only 2.3 m, Figures 7 and 10). The vessel informed that her position was 61°06.8105' N and 021°09.0753'E.

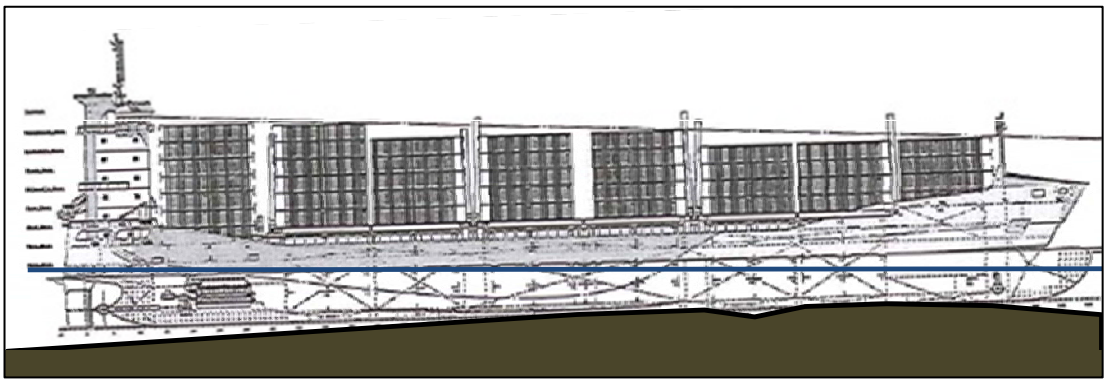


Figure 9. PHOENIX J aground. The number of containers shown in the figure is a theoretical maximum (source: the shipping company webpage). Figure 1 shows the number and location of containers at the time of the accident.

According to the diver's report[17] the vessel was aground from midships towards the bow (between the frames 90–118 and 138–153), Figure 9. Her forward draught was approx. 5 m and the aft draught was approx. 8.7 m, and she had a starboard list of approx. 2.5 degrees[18].

The most important events and their times can be seen in Table 1 below. Figure 10a portrays the vessel's position when the VTS contacted her, and in Figure 10b the vessel is heading towards the shoal at 12.56.52 with a full speed of 13.2 knots.

[16] VTS calling the PHOENIX J in the VTS recording.
[17] The reports of DG-Diving Group on the dives on 19 and 23 April 2012.
[18] The vessel's logbook.

Table 1[19]. The times of the events. PJ stands for PHOENIX J and HF for HARBOUR FOUNTAIN. In closer detail in the text.

Time	Phoenix J (PJ)	Pilot	Pilot boat	Harbour Fountain (HF)	VTS
11:54	Pilot boarding Phoenix J			Waiting at sea	Monitoring traffic
11:55					
11:56	Pilot informs VTS about PJ's start				VTS acknowledges saying that
11:57	Pilot answers VTS that HF may know this				HF knows this
11:58					
11:59					
12:00					
12:01					
12:02					
12:03					
12:04					
12:05					
12:06	Leaves port		Follows PJ		
12:07					
12:08				Calls pilot	
12:09					
12:10					
12:11					
12:12					
12:13					
12:14					
12:15				Calls pilot	
12:16		Makes arrangements with VTS		Calls pilot	Makes arrangements with pilot
12:17				Starts moving	VTS informs HF
12:18					
12:19					
12:20					
12:21					
12:22					
12:23					
12:24					
12:25					
12:26					
12:27					
12:28					
12:29					
12:30					
12:31					
12:32		Makes arrangements with VHF		HF acknowledges	
12:33					
12:34				1 NM to pilot	
12:35				boarding area	
12:36					
12:37					
12:38					
12:39	Starts to turn to north, the pilot begins to leave		Gets closer to PJ	At pilot boarding area	
12:40	Pilot disembarks		At PJ	Does not slow down	
12:41	Pilot disembarks		At PJ		
12:42	Pilot onboard pilot boat			Calls pilot who answers	
12:43			Moves away from PJ	1 NM past boarding area	
12:44	Starts to turn to the left				Zooms screen for HF
12:45	Course to the west				Monitors HF,
12:46		Appoints HF's position	Behind the HF		PJ outside screen display
12:47	At fairway's north border				
12:48	Making ready for open sea	Pilot boarding HF, pilot boat moves away			
12:49	OOW calls to Gävle		Towards Rauma port		
12:50	Course about 255			At fairway's south border	
12:51	In middle of fairway			Pilot informs VTS that he	
12:52				is on HF's bridge	VTS acknowledges
12:53					Zooms back;
12:54	Past fairway's south border				Screen goes black
12:55					Screen OK, calls PJ
12:56					and asks her draft;
12:57	PJ tries to swerve				Warns of ground
12:58	Runs aground				
12:59					
13:00	Informs about grounding				Calls PJ
13:01					Calls MRCC

[19] In order to illustrate the passing of time, all lines in the table indicate the interval of one minute 11.54–13.01.

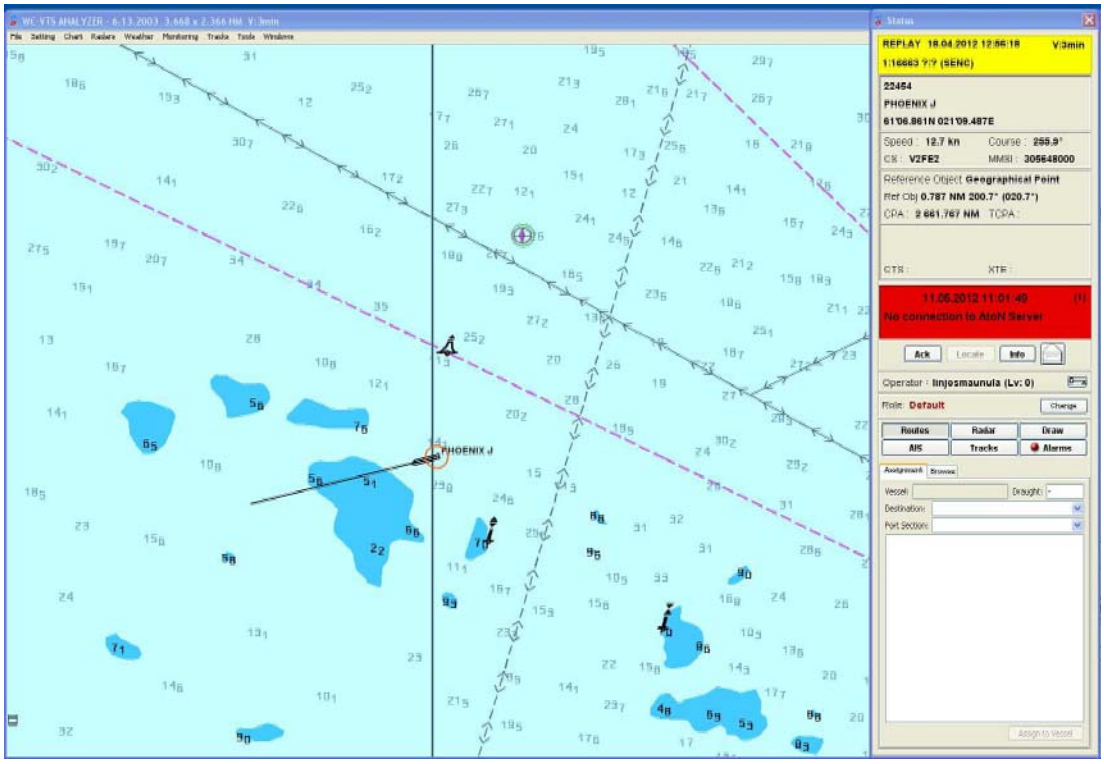


Figure 10a. The position of the PHOENIX J when the VTS started the approx. 20-second-long communication at 12.56.18. Print screen from the VTS recording.

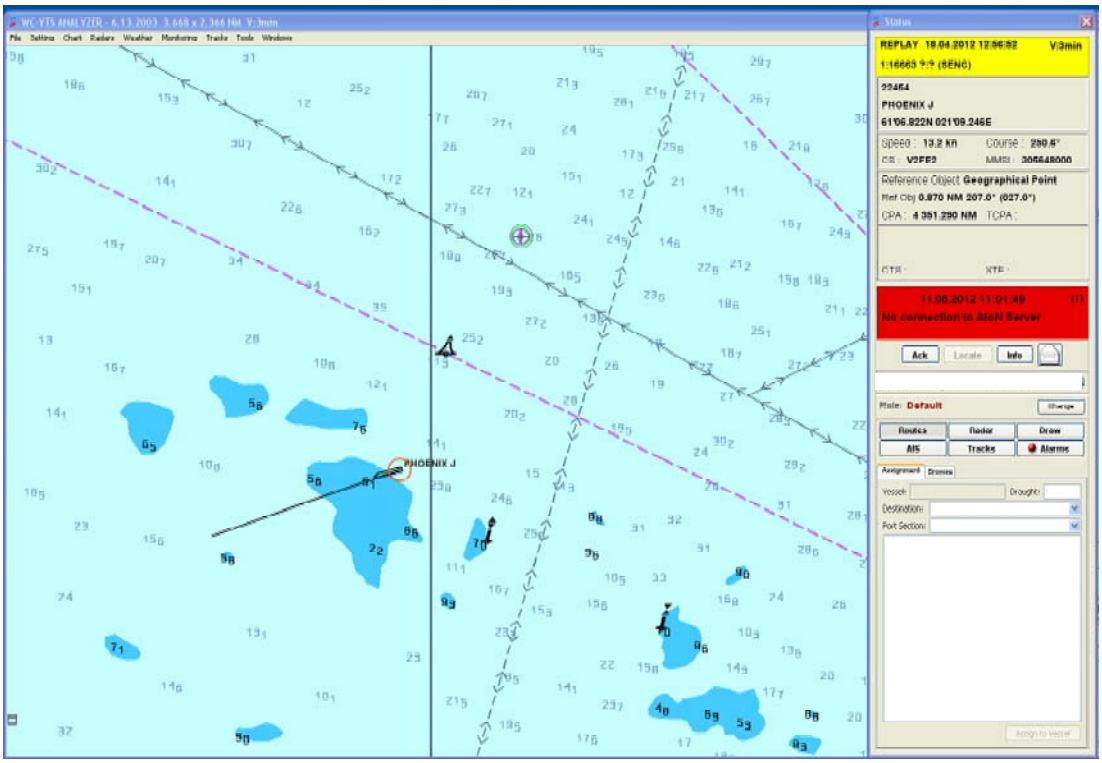


Figure 10b. The PHOENIX J about to run aground with the speed of 13.2 knots at 12.56.52. Print screen from the VTS recording.

The section figures in Appendix 1 contain extracts from the VTS recording from the time when the vessel was preparing to disembark the Pilot and her proceeding to the shoal.

1.2.5 Measures after the incident[20]

After the grounding, the OOW raised alarms on the vessel. The Second Officer switched the grounding-mode to the AIS system. After that the Master contacted the VTS and asked the Second Officer to check how the crew assembled at the muster station was doing. The water level of the vessel's tanks was checked (sounded) and the tightness of the cargo holds was inspected. The water depth around the vessel was checked. The main engine was stopped at 13.28. The port anchor was lowered at 13.48. The Coast Guards arrived at 14.50 and breathalysed the crew; the result was zero permilles. The Alfons Håkans tugboat NEPTUN arrived at the scene at 18.10 and the rescue operations began.

1.2.6 Injuries to persons

There were no injuries to persons.

1.2.7 Damages to the vessel[21]

It was concluded in the inspections that there was water in the aft part of cargo hold number 1 as well as in the pipe tunnel.

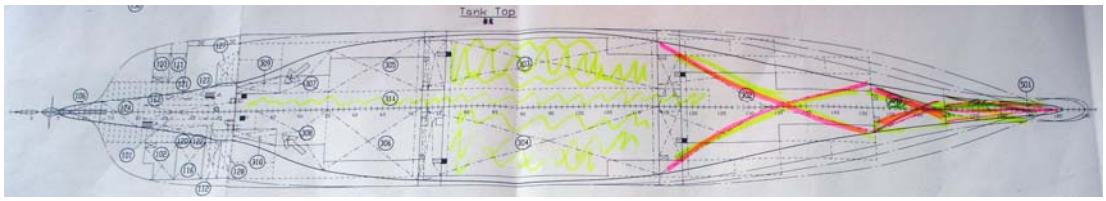


Figure 11. The extent of the leakages. Drawing Germanischer Lloyd.

The even part of the vessel's bottom from midships towards the bow, extending between frames 90 and 183, had been damaged. There were fractures and dents in the bottom plates. In addition to the pipe tunnel, there were leakages in the following ballast tanks: forepeak, double-bottom tanks 1 and 2 in the middle and 3 on the starboard side. There was a leakage in cargo hold number 1. The water level in the cargo hold remained at 15 cm with the help of the vessel's own pumps. The bottom of the hold had risen somewhat up on a large area and split at frames 122–124, next to the longitudinal bulkhead. Several cracks, which were as long as 600 mm and as deep as 400 mm, were detected in the area of the even bottom between the frames 95 and 183, to port from midships (Figure 13). The bulkhead of the starboard side heavy fuel oil tank on frame 118 had buckled just above the bottom of the hold. No leakages were detected in the heavy fuel oil tanks (Figures 11, 12a and 12b).

The rudder and the propeller were not damaged, and the bow thruster was also intact.

[20] The times from the vessel's logbook.

[21] Reports by the Germanischer Lloyd inspector on 20 and 23 April 2012 and Figures 14a and 14b. (based on the reports by the divers).

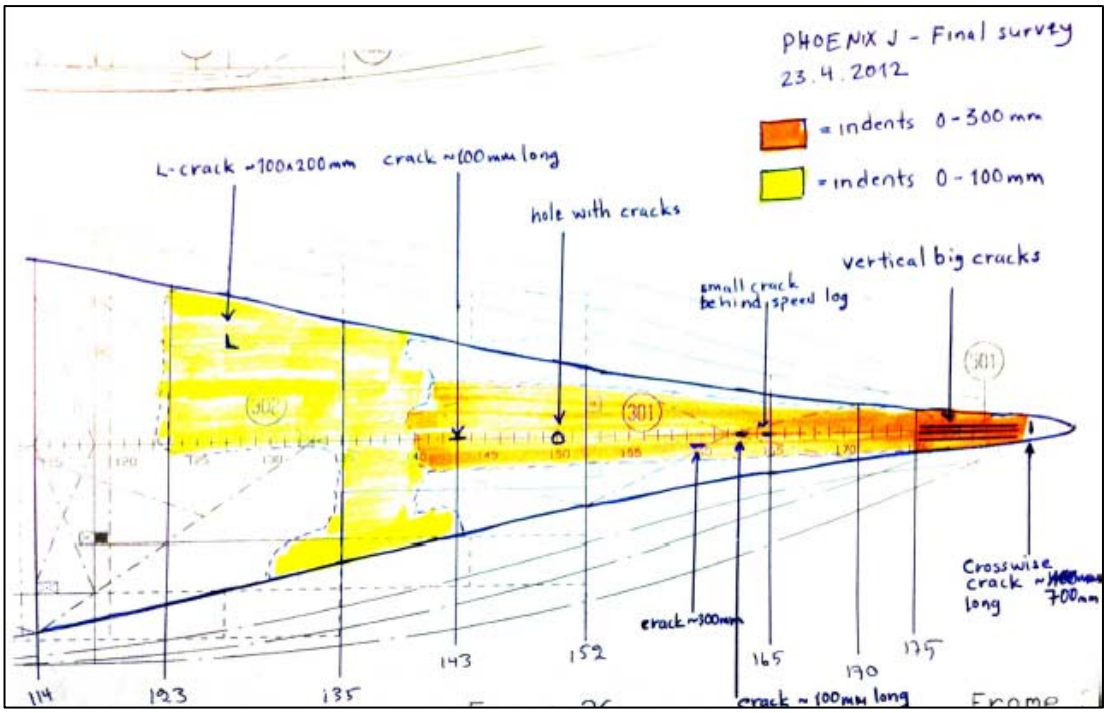


Figure 12a. A graph by the classification society on the damages to the bow. Drawing Germanischer Lloyd.

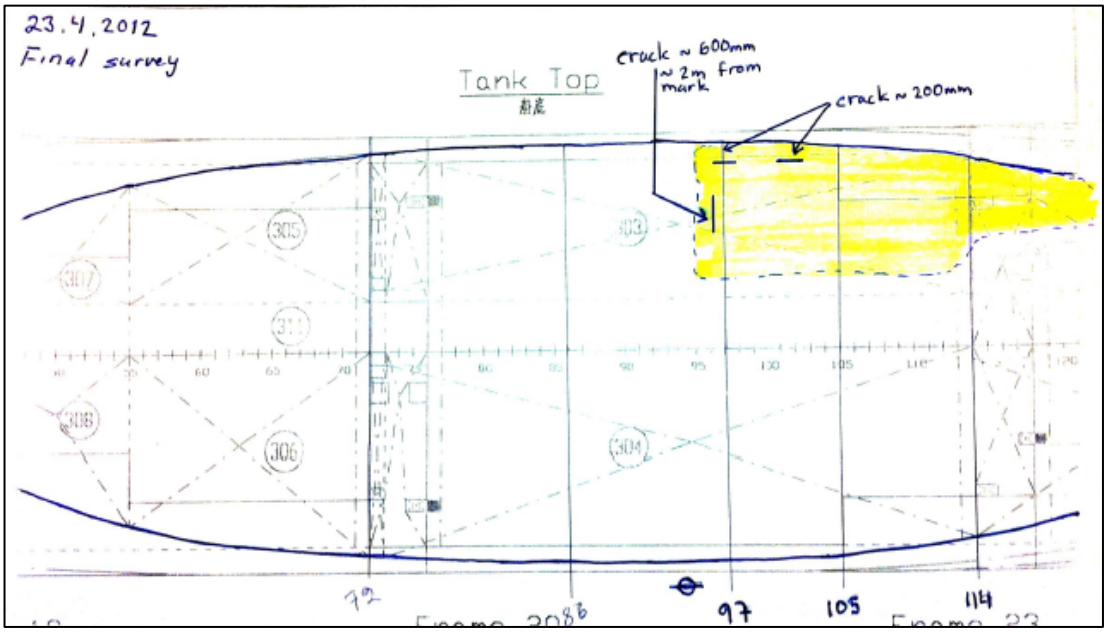


Figure 12b. A graph by the classification society on the damages more aftwards. Drawing Germanisher Lloyd.

Figure 13. Crack at the bow on frame 182. Photo taken by the diver.

1.2.8 Registration equipment

The vessel has an S-VDR, which records radar image and information based on it as well as communication on the bridge and other sounds. This material was not received from the shipping company.

1.2.9 Operation of the VTS and supervision systems

The investigators obtained for their use the VTS files on the time of the accident. The passage of the PHOENIX J, the HARBOUR FOUNTAIN and the pilot boat can be seen in the recording which also contains the VHF communication during the incident. The VTS channel is 9 (simplex). The channel reserved for pilots is 13 (simplex)[22].

1.2.10 Fairway equipment

The Rauma lighthouse stands approx. 3 kilometres north from the pilot boarding area and acts as a good reference point. On the southern side of the fairway there is a plastic light buoy 0.45 Nm SSW as well as an east spar buoy west of the grounding position. The fairway equipment was in working order and in their correct places.

1.3 Rescue activities

1.3.1 Alerting activities

The VTS informed the Maritime Rescue and Coordination Centre and Turku Radio about the situation with a 20-second-long communication[23] at 13.00.08. The MRCC has noted receiving information at 13.02[24]. The MRCC contacted the vessel with VHF and learned about the situation: no injuries to person, vessel aground and situation calm. A coastguard patrol and a RIB boat from the Rauma coastguard and patrol boat TURSAS

[22] The purposes of use of maritime VHF channels in Finland, the Finnish Communications Regulatory Authority 22 September 2004. A simplex channel is formed from one frequency, the listening and speaking is done in turns.

[23] In the VTS recording

[24] MRCC list of actions 23 April 2012, action 342

as well as a helicopter from the guard flotilla (RajaHeko100) and a patrol plane (FinnGuard800), which was on a patrol flight, were alerted to the scene. It took 10 minutes for the last-mentioned to arrive to the scene, and it did not detect any discharges or a list.

1.3.2 Initialising rescue activities

The Rauma patrol breathalysed the watchkeeping crew and performed the preliminary hearing and gathering of documents. The MRCC arranged with the Finland's environmental administration that TURSAS prepared for possible prevention of an oil spillage.

The RajaHeko100 helicopter was ordered to standby at the Pori airport, but it was later released from this duty after which it transferred to Turku. Preparedness for an evacuation operation was continuously maintained.

At 13.21 the MRCC notified a Maritime Inspector in Vaasa about the incident and at 13.44 the Safety Investigation Authority. The salvage company Alfons Håkans started to mobilise its vessels and equipment at 15.00. At 18.10 the tugboat NEPTUN arrived to the PHOENIX J with the Maritime Inspector onboard. The situation on the vessel was investigated and a diver surveyed the vessel's damages already in the evening of 18 April.

1.3.3 Rescuing the vessel[25]

The salvage company brought tugboats and salvage equipment to the scene. On 20 April pumps were installed on the vessel and pneumatic appliances in the leaking tanks. Tightening and patching work was continued on 21 April when an attempt was made to refloat the vessel. The attempt was interrupted because of a strong wind, Figure 14. The sea level during the rescue operations is shown in Figure 15.

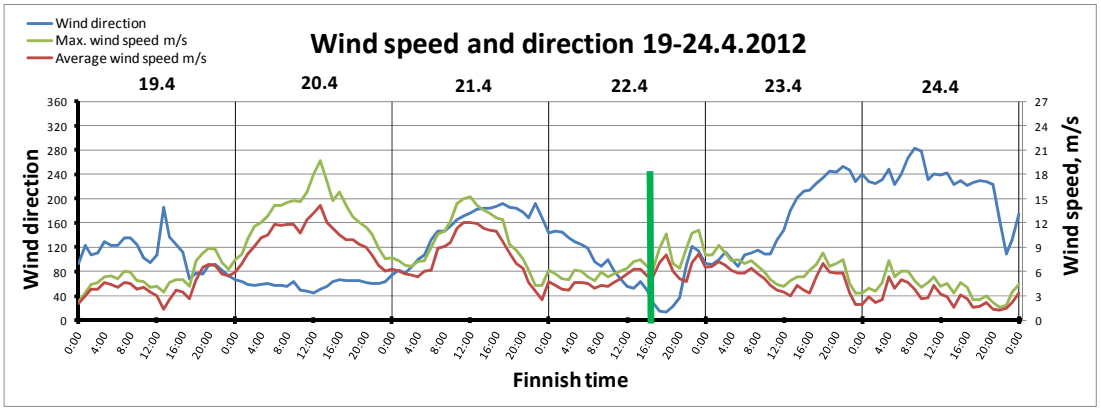


Figure 14. Wind conditions during the rescue operations in Kylmäpihlaja. The green line indicates the time of refloating.

[25] The vessel's logbook and the report by the salvage company

Figure 15. Sea level in Rauma at the time of the accident and rescue operations.

In the afternoon of 22 April water was pumped off the tanks in the bow and water was pumped to aftpeak tanks. The vessel was refloated from aground at 15.45 on 22.4.2012. After the refloating, the forward draught was 5.4 m and the draught aft was 8.4 m. Tugboats took the vessel to the port. The Finnish Transport Safety Agency and the classification society inspected the vessel's damages and leakages. On 24 April, the diver patched the leakages with temporary solutions using wooden wedges and patching mats.

Figure 16. Attempt to refloat the vessel on 21.4.2012. Photo by the diving company.

On the request made by the Finnish Transport Safety Agency the vessel's cargo was unloaded. After getting a written permission, the vessel left for a dockyard in Germany without assistance. The classification inspection of the repairs to the vessel was carried out in Bremerhaven on 1.8.2012. Altogether 13 new double bottom sections were installed.

1.4 Special investigations

1.4.1 Investigations on the vessel and at the scene of the incident

An investigator photographed the vessel's bridge and talked with the Master, the officers and with a shipping company representative on 24 April 2012. The bridge was photographed as a panorama shot on the commissioning by the Safety Investigation Authority on 27 April[26].

1.4.2 Technical investigations

The technical investigations mainly concentrated on the studying of the VTS recordings.

1.4.3 Actions by the crew and passengers

The crew acted after the grounding under the command of the Master in accordance with the vessel's emergency instructions.

1.4.4 Organizations

Several organizations were involved in the accident. The Rauma pilot station of the Finnpilot Pilotage Ltd belonging to the administrative section of the Ministry of Transport and Communications was involved, as was the West Coast VTS belonging to the Finnish Transport Agency. In addition, the vessels PHOENIX J and HARBOUR FOUNTAIN and their shipping companies were concerned.

It is worth noticing that even though pilotage and vessel traffic services both belong to an administrative section of the Ministry of Transport and Communications, the administration and supervision of their operations lie within different organizations. The Finnish Transport Safety Agency supervises pilotage, and the Ministry of Transport and Communication acts as the competent authority as regards to vessel traffic services[27] whereas the Finnish Transport Agency acts as the corresponding administrative authority.

The master of the vessel is responsible for the safe operating of the vessel. The flag state authority is the primary organ monitoring the company and its vessels to ensure compliance to all international rules, regulations and conventions. It is the responsibility of the shipping company to define safe practices concerning the deployment of the vessel and to ensure that these practices are observed (SMS, see 1.5.1).

[26] Tiimataito Oy
[27] Vessel Traffic Service Act, 5.8.2005/623

1.4.5 Other investigations

No other investigations.

1.5 Rules and regulations guiding the operations

The vessel's documents were valid and in order. The operating instructions of the pilot station were dated 4.10.2011. The operations manual of the West Coast VTS Centre had been updated on 21.3.2011.

1.5.1 International agreements and recommendations

The vessel-specific instructions are derived from *the International Safety Management Code, ISM.* On the basis of this code the shipping companies draw a Safety Management System (SMS) which define safe practices in ship operation and ensure the implementation of these practices. SMS is periodically checked by the administration. The personnel should be trained and their knowhow maintained in accordance with the prevailing regulations. (The instructions should include e.g. safe practices concerning the cooperation with the pilot and communication with the VTS, even though not directly required by the code).

There are regulations on lookout in the International Regulations for Preventing Collisions at Sea (COLREG, 1972), in which rule 5, lookout, states that"Every vessel must at all times maintain a proper look-out by sight and hearing".

According to *Section B-VIII/2* in the International Convention on Standards of Training, Certification and Watchkeeping for Seafarers (STCW-95), no person in charge of navigational watch should be burdened too much or given such difficult duties that the effective performance of those duties suffers.

IMO guidelines on pilotage and vessel traffic services

The guidelines issued by the IMO are neither homogenous nor comprehensive. There are instructions only on drawing the voyage plan, bridge co-operation and going through vessel information prior to commencing the pilotage. In addition to this, the STCW 95 Resolution defines e.g. the basic knowledge concerning pilotage included in the training of Master Mariners[28].

The principles of vessel traffic services have been described in several IMO documents[29] which are based on the IALA recommendations (International Association of Marine Aids and Lighthouse Authorities).

[28] Resolution A.960(23), 5 December 2003. Recommendations on Training and Certification and on Operational Procedures for Maritime Pilots other than Deep-Sea Pilots.

[29] SOLAS Regulation V-12 "Vessel Traffic Services", IMO Resolution A.857(20) Guidelines for Vessel Traffic Services, IMO Resolution A.851(20) General Principles for Ship Reporting Systems and Ship Reporting Requirements, Resolution MSC.43(64) Guidelines and Criteria for Ship Reporting Systems, IMO Resolution A918(22) IMO Standard Marine Communication Phrases, IALA Vessel Traffic Services Manual (2008).

1.5.2 National legislation, orders and instructions

Pilotage The Government Decree 10.3.2011/246 stipulates on the obligation to use pilot.

The Finnish Transport Safety Agency has defined the fairways to be piloted and their pilot boarding areas. The pilot boarding areas marked on the chart are mainly located at the open sea. The objective has been to escort the vessels past the rocky waters.

For operative activities, Finland has been divided into six pilotage areas with 25 pilot stations. The operations are based on the Finnpilot Pilotage Ltd service conditions. When the accident took place, the prevailing conditions were those of 1.1.2011 (the most recent ones came into effect on 1.7.2012). There are three zones for the ordering of a pilot: the Eastern, the Southern and the Western pilotage zones. The ordering of a pilot is divided into two steps.

The agents of the inbound vessels supply the Pilot Order Centre with the weekly lists of *inbound vessels*. The vessel has to provide the Pilot Order Centre with advance information 12 hours and make a pilot request three hours before arriving to the pilot boarding area. If needed, the pilot contacts the vessel with VHF when the vessel's distance is less than an hour[30].

When leaving the port, the vessel has to provide the Pilot Order Centre with advance information 12 hours prior to leaving the port. A binding order shall be made two hours before departure from the port.

Vessel Traffic Service. Vessels with the maximum length of at least 24 metres are required to participate in vessel traffic services by reporting to the VTS, by listening to VHF channel 9 and by complying with the regulations on operating on the VTS area.

The sea areas of the coast of Finland are divided into six VTS areas.

The traffic image of the VTS area and the related VHF radio communication are recorded at the VTS centres. The recordings are kept at least for 30 days. The various services provided on the different VTS areas are described in the VTS area-specific guides.

1.5.3 Quality systems

Shipping company

The quality and management system of the shipping company is based on the international ISM Code. The operational instructions of Safety Management Manual (SMS) of the shipping company must include instructions on e.g. the embarkation and disembarkation of pilot. The master is responsible for the implementation of the vessel's Safety Management System. The classification society Germanischer Lloyd had been authorised by the flag state to audit the vessel and shipping company instructions, and has issued the vessel a Safety Management Certificate, which is valid 29.3.2011–9.3.2016.

[30] In the pilot ordering instructions there is no information on which VHF channel the vessel can use to contact the pilot when coming to the pilot boarding area. This is a customary international procedure.

Finnpilot Pilotage Ltd

The Finnpilot Pilotage Ltd employs the ISO 9001 quality management system, which has been audited by Det Norske Veritas in 2011. Finnpilot Pilotage Ltd uses a non-conformity reporting connected to the reporting of pilotage operations, in which possible divergences from the normal practices can be entered after each pilotage operation. The classification of non-conformities may include e.g. a technical failure onboard the vessel, a close call, collision with a quay, collision with a navigation mark etc. The non-conformities are discussed at station meetings and when necessary, they are made known to a larger number of persons through intranet.

Finnish Transport Agency / Vessel Traffic Service

The unit providing Vessel Traffic Services did not have any quality system when the accident occurred.

2 ANALYSIS

2.1 Method of analysis

The analysis has been carried out by using the Accimap method[31]. The Accimap analysis below, Figure 17, the analysing text and its structuring have been compiled by the investigation group in an interactive manner. The Accimap analysis has also been used in order to portray the incident and the contributing background in an abbreviated form.

As a whole the situation evolved from the following premises:

- A westerly wind blew 10–12 m/s.
- The PHOENIX J had departed as usual with a pilot onboard. The pilot boat followed her.
- Out at the sea the HARBOUR FOUNTAIN was waiting permission to proceed towards the pilot boarding area. The pilot was to transfer to this vessel.
- West Coast VTS monitored the traffic.
- Visibility was good; the equipment of the PHOENIX J was in working order as was the fairway safety equipment.
- The pilot, VTS, HARBOURT FOUNTAIN and PHOENIX J were aware of each other and could monitor each other's movements, when applicable.

The direct cause of the accident was *a human error*: The Master of the PHOENIX J had not checked the vessel's position after the Pilot had disembarked the vessel and steered the vessel in a wrong direction. Human error as a cause does not, however, explain anything as such, so one has to try to identify factors in the actions of the various parties which led to PHOENIX J running aground. The concerned parties included the Pilot, the VTS operator and the Masters of the two vessels.

The purpose of the orders made on the various **organisational levels** is to e.g. ensure the safe passage of the vessel from the open sea to port and then back to the open sea.

The following section details (in italics) the Accimap analysis.

Essential observations concerning Accimap include: the contents of the instructions of the Pilot and VTS as well as of the vessel's safety management system, the practices which have arisen on the basis of the instructions and the cooperation between the Pilot

[31] Accimap is a risk control method which has been built up to prevent accidents. It can, however, be used also in accident investigation in order to analyse the factors which have affected in the background and in choosing and targeting the most effective safety recommendations. According to the method, in high-risk activities there are many actors operating on different levels of decision-making. When analysing an accident, these actors should be identified. An accident is thought to be a chain of events. For each event in the chain, the first analysis concentrates on which technical and performance level human factors have contributed to the realisation of the event in question. The analysis is carried on upwards, level by level, and the objective is to find from the higher levels factors which have affected the activities on the lower level. In the Accimap chart compiled on the basis of the analysis, the various level actors are presented on horizontal levels and the chain of events proceeding from left to right is illustrated on the bottom-most level of the chart. The chain of events is described as separate events, which are combined with arrows describing how the chain of events proceeds. The connections between the events and the various-level factors explaining them are also described by using arrows. Source: J.Rasmussen ja I.Svedung, 2000, Proactive Risk Management in a Dynamic Society, Swedish Rescue Services Agency, Karlstad, Sweden.

/ Master / VTS. The functioning of the cooperation between pilotage and vessel traffic services is by no means self-evident as these operations belong to different implementing entities.

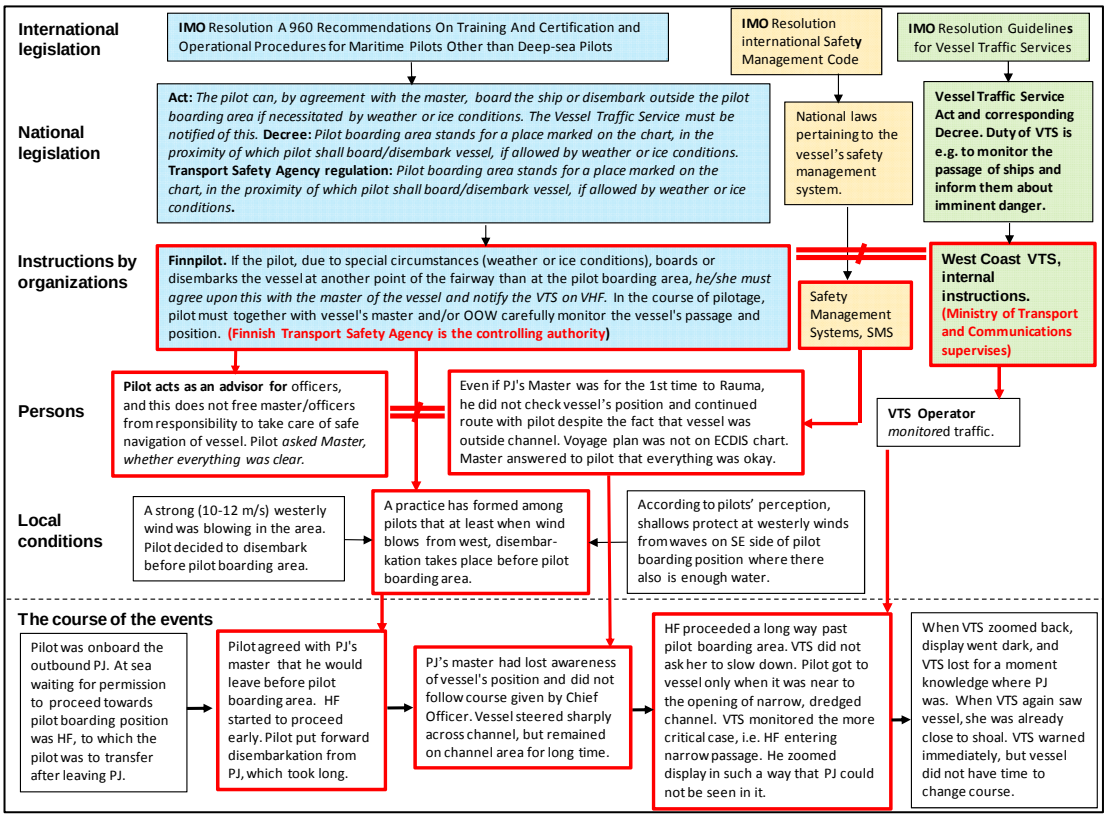


Figure 17. The organizations involved in the accident and the course of events. PJ stands for M/S PHOENIX J, HF for M/S HARBOUR FOUNTAIN and VTS for VTS operator.

2.2 Events contributing to the accident

The following events and their combined effect have been identified as factors contributing to the accident:

2.2.1 Events during the pilotage

The voyage plan of the PHOENIX J had not been marked on the ECDIS chart. The vessel's voyage plan which was in chart-form and marked on a paper chart was not realised as the vessel's route changed considerably when the Pilot disembarked the vessel before the actual pilot boarding area. *The voyage plan had not been entered on the ECDIS chart* prior to starting the voyage. The Pilot did not need this entry, but it would have facilitated monitoring the vessel's passage and especially its return to the correct route after the disembarkation of the pilot. The Chief Officer added the direction past the pilot boarding area only after the Pilot had disembarked the vessel.

The Pilot disembarked the vessel before the pilot boarding area. When taking the weather conditions in to consideration, the disembarkation took place *before the pilot*

boarding area, a praxis which has become common in Rauma. This time the disembarkation took place exceptionally early, i.e. approx. four kilometres before the pilot boarding area marked in the navigational chart, apparently because there was a risk that the HARBOUR FOUNTAIN would proceed too far towards the narrow part of the fairway.

As required by the regulations, the Pilot had agreed with the Master upon early disembarkation. *The early disembarkation and the manoeuvre required for it* became clear for the Master of the PHOENIX J at the latest when the Pilot notified the HARBOUR FOUNTAIN of his plan.

The HARBOUR FOUNTAIN had, once it had started to sail towards the pilot boarding area, proceeded with such high speed that *the vessel had clearly passed the pilot boarding area* before the agreed time. The Pilot had contact with the vessel. He informed a too optimistic time to the HARBOUR FOUNTAIN for the embarkation, because leaving the PHOENIX J took longer than usual because of the completed northern turn and the heavy sea. Because of this delay the HARBOUR FOUNTAIN started to approach the narrow passage of the fairway.

2.2.2 Situational awareness after the Pilot had left the bridge

Information exchange between the Pilot and the Master when the Pilot left the vessel was insufficient. Before leaving the bridge, the Pilot indicated the vessel's position on the ECDIS chart and asked the Master whether everything was in order and received an affirmative answer. The new heading and the route back to the fairway and further to the open sea were not told to the Master, who did not enquire after them. *Neither party made any confirmations regarding the subsequent route.* Leaving the bridge was probably carried out in haste so that the HARBOUR FOUNTAIN would not proceed too far. The Pilot may have presumed that the Master was up-to-date regarding the situation because he had seemed to be skilful. In addition the vessel's equipment was modern and functional.

The Master of the PHOENIX J lost his perception of the vessel's position. During the pilot disembarkation manoeuvre, the PHOENIX J proceeded north, far outside the fairway area (Figure 7). The Master manoeuvred the vessel from the bridge wing. When he returned to the bridge, he could not monitor the passage of the vessel from the radar or from the electronic chart. When coming back to the middle console after the Pilot had disembarked, *he was not fully aware of the vessel's position.* The vessel had to perform a long turn towards port, outside the fairway area, in order to get back to the fairway. This considerable divergence from the fairway may have confused the Master, especially as this was his first visit to Rauma. At the most the vessel was almost a kilometre on the starboard (northern) side of the fairway.

The Chief Officer did not influence the passage of the vessel; he was concentrating on other duties. To the Master he recommended the course of 270 degrees, which would have taken the vessel past the shoal. He did not check that the Master employed this course. The Master probably chose the 254-degree course marked by the Chief Officer on the ECDIS chart after the Pilot had disembarked the vessel. This course led from the

Rauma lighthouse to the pilot boarding area in Gävle. This corresponds with the vessel's passage in the VTS recording. *The cooperation between the Master and the Chief Officer did not work.* The Second Officer, who had come to the bridge just before the grounding, was not yet up-to-date concerning the situation.

2.2.3 VTS operations

The VTS concentrated on monitoring the inbound vessel. The Pilot had contact with the HARBOUR FOUNTAIN and agreed on transferring to the vessel. The too optimistic schedule for this transfer may have had such an effect on the passage of the vessel that the vessel proceeded without reducing speed well beyond the pilot boarding area. *The VTS did not try to slow down her passage* and the vessel passed the pilot boarding area approx. 7 minutes before what had been agreed.[32]

The VTS monitors and guides traffic in the fairways, but does not have such strong authority to intervene with the manoeuvring as a pilot does. The VTS intervenes with the passage of the vessel only in a dangerous situation when the vessel's safety is jeopardised.

After the disembarkation of the pilot, the PHOENIX J started to proceed from the VTS operator's perspective (and also from the Pilot's perspective) in a logical manner first towards the fairway and continuing towards the fairway centre line and was thus in safe waters. *At that stage there was no reason to intervene with the passage of the vessel.*

When the Pilot had taken over the steering of the HARBOUR FOUNTAIN, the vessel was approaching the narrowest, dredged section of the fairway, and because of this *the VTS operator started to monitor her more closely* by using a zoomed display. The passage of the HARBOUR FOUNTAIN right at the southern edge of the fairway required special attention, whereas the PHOENIX J seemed to proceed safely in the fairway.

The warning about the shoal did not come in time. The VTS operator's display went dark for a moment when he zoomed it to the size in which the PHOENIX would appear on the screen. When the display was functioning again, the PHOENIX J had already passed the border of the fairway area and her course was directly towards the shoal. Complying with the instructions he had, the VTS operator checked the draught of the vessel, which took some time. After receiving the confirmation, he warned about the danger. *When the warning was issued, the shoal was so close that nothing could be done.* According to the VTS instructions, the VTS should warn a vessel about an imminent danger.

2.3 Significance of the instructions and practices of the organizations

Legislation. The objective of pilotage is to bring the vessel safety to port and back to open sea, past the shoals, assisted by a pilot who is familiar with local conditions. The objective of the VTS is to guide vessel traffic and warn about a danger. The vessel's master is, however, always responsible for the passage of his/her vessel. All these op-

[32] There is nothing about agreeing on this in the VTS recording; information provided by the pilot.

erations are regulated by international agreements, Finnish legislation and rules and instructions issued by authorities, and their purpose is to ensure adequate safety.

The personnel was trained, each person for his/her own special field. All persons had the required formal competence, necessary training, experience of his/her work and the instructions issued by their own organizations. All this did not prevent the accident from happening. *The cooperation between the various partied is based on trust on the skills and knowledge of the other parties and on complying with the agreements and regulations.* On the other hand, this trust raises the threshold to intervene with the actions of the other parties or to check that information has got through and been understood in critical information transfer situations. The activities are too often too compartmentalized when each party tries to manage well its own area of specialty. The pilot-Master cooperation and the caution of the VTS operators to intervene with the passage of the vessel constitute examples of this.

Adaptation of practices. Persons who are able to perform their duties aim to act in a safe way but at the same time effectively[33]. In the long run, when the involved parties notice that the operations are carried out in a safe manner, *the applied interpretations of the laws and instructions become more straightforward and new, cross-cutting practices evolve.* An example of this is the pilots' practice to disembark the vessel before the ordinary pilot boarding area, which has become more frequent. The pilot regulations allow this in exceptional circumstances.

Development needs of two kinds can be extracted from the analysis above. They have also been observed in the prior accident investigations related to pilotage.

Developing the instructions of the organizations.

- VTS must focus on the fact that the inbound vessel should not substantially pass the pilot boarding area before the pilot boards the vessel.
- Finnpilot Pilotage Ltd must specify their instructions on the disembarkation from the vessel / boarding the vessel on the area between the pilot boarding area and the port.
- The shipping company must specify its instructions in such a way that the master has to confirm how the voyage is to be continued before the pilot leaves the bridge.

Developing the cooperation between the VTS and Finnpilot Pilotage Ltd.

- When the pilot disembarks the vessel, the VTS must monitor the passage of the vessel, especially if the pilot has left the vessel before the pilot boarding area. After the accident of the PHOENIX J, these organizations have made concrete suggestions regarding the specifying of the instructions; see Chapter 4 in the investigation report.

[33] SidneyDekker, The Field Guide to Understanding Human Error. Ashgate Publishing Ltd, 2006, reprinted 2011.

Previous accidents. In appendix 2 there is a summary on the 8 accidents in Finland investigated by the Safety Investigation Authority in 2000–2012 which have occurred in connection with pilotage / pilot disembarkation. The small quantity shows that this accident type is rare indicating that piloting in general is safe. Observations on the improvement of the cooperation between the VTS and pilots have been presented especially in the analysis and conclusions of the investigation report C1/2011M STADIONGRACHT.

2.4 Alerting and rescue activities

Alerts. The Master of the vessel notified the VTS about the situation immediately after the ground touching. In accordance with its instructions, the VTS immediately informed about the situation to the MRCC which launched rescue operations. The equipment alerted to the scene was adequate considering the situation, which was monitored continuously.

Rescuing the vessel. The temporary tightening of the hull and pumping performed by the salvage company were executed in close cooperation between the vessel's Master, the shipping company, the insurance company and the Finnish Transport Agency maritime inspectors. The vessel was not refloated until its leakages were under control and the weather was good enough. The safe passage of the vessel from Rauma to Germany was ensured by unloading the cargo and by the patching-work carried out by the divers.

Significance of the damages. The vessel had run aground on a flat rock, there was no danger of listing and she could not sink deeper. She also did not glide off the shoal. The wind and sea did not turn strong. The leakages did not exceed the capacity of the vessel's pumps. There was no haste with the rescue activities, but there was time to plan the lightening measures to the bow and the temporary patching of the holes.

3 CONCLUSIONS

3.1 Findings

1. The visibility was good.
2. Strong wind and heavy sea contributed to the fact that the Pilot disembarked the vessel before the pilot boarding area and the vessel had to navigate past the shoals using its own resources.
3. The PHOENIX J would have avoided running aground if she had been piloted to the pilot boarding area.
4. The engines, manoeuvring devices and navigating equipment were in working order.
5. The fairway safety equipment was in working order.
6. There were no environmental damages.
7. There were no injuries to persons.
8. The inbound HARBOUR FOUNTAIN had passed the pilot boarding area too early and proceeded inwards without anybody intervening with the situation.
9. The Pilot had to leave the bridge of the PHOENIX J with haste, because the HARBOUR FOUNTAIN was proceeding too far.
10. When the Pilot was leaving and after he had left, enough attention was not paid to the navigation on the bridge of the PHOENIX J. The cooperation between the Master and the Chief Officer failed. The voyage plan had not been entered to the ECDIS display before the voyage.
11. The VTS operator had no reason to monitor the PHOENIX J which was proceeding in the fairway, especially when at the same time another vessel was entering the narrowest passage of the fairway.
12. The VTS operator could have warned about the dangerous course somewhat earlier had there not been disturbances in the display.
13. The PHOENIX J suffered from minor damages in her bow. These damages led to leakages.
14. The alert about the grounding was quick and complied with the instructions.
15. After the grounding the crew of the PHOENIX J acted swiftly and carried out necessary inspections.
16. Refloating the PHOENIX J from aground was carried out in a controlled manner, with forethought and without jeopardising safety.

3.2 Events contributing to the accident

The Pilot disembarked the PHOENIX J markedly before the actual pilot boarding area after agreeing on this with the Master (the heading was 80 degrees off the direction of the fairway). The disembarkation took place somewhat north of the fairway area to allow the Pilot's transfer to the pilot boat in the lee of the wind. The inbound vessel, M/S HARBOUR FOUNTAIN, which the Pilot was to board next, had proceeded her voyage past the pilot boarding area and the Pilot decided to bring forward the transfer more than usual. The Master of the PHOENIX J lost his perception of the vessel's exact position possibly because of sharp turn towards north and the manoeuvring required by the Pilot's disembarkation. The vessel's route had not been entered on the ECDIS chart. The Master changed the vessel's course too early towards Gävle, approx. 254 degrees towards the shoal, not to the course of 270 degrees recommended by the Chief Officer. The VTS operator monitored the Pilot boarding the inbound vessel, which had already proceeded far and close to the southern border of the fairway, where the fairway starts to narrow. As a result of this monitoring and the temporary disturbance in his display unit, the VTS operator noticed that the PHOENIX J was proceeding towards a shoal so late that the grounding could not, in spite of a warning, be avoided.

The PHOENIX J case, too, highlighted the factors observed in the previous pilotage-related accidents. These factors emphasize the need to improve instructions pertaining to both the organizations' own activities as well as their cooperation.

4 IMPLEMENTED MEASURES

Pilotage Instruction. Finnpilot Pilotage Ltd completed the procedures described in its pilotage instruction as to the pilot boarding area in their new instruction, which entered into force on 3 May 2012[34]. The following was added at the beginning of point 6: *The pilot must board the vessel or disembark the vessel in the proximity of the pilot boarding area.*

Cooperation pilots/VTS. The Finnish Transport Agency acting in its role as the VTS authority and Finnpilot Pilotage Ltd launched in 2011 a cooperation project in order to establish common practices. Management groups of both parties held in April 2011 their first joint meeting, which was preceded by an operational meeting held by the performing level at the Helsinki pilotage area. The objective is to have two-level meetings with regular intervals. Rauma pilot station and West Coast VTS met, expedited by the accident, in an already earlier appointed meeting on the cooperation on the Sea of Bothnia area.[35] Below excerpts from the meeting memorandum:

> *In order to improve the cooperation between VTS and pilots, common practices are agreed on. These practices clarify the operations and in this way advance the safety of vessel traffic. The objective is to improve the mutual communication and reciprocal situational awareness between the VTS and the pilots.*
>
> *These are not actual instructions, but the objective is to improve reciprocal awareness of the other party's needs and courses of action regarding pilot boarding and disembarkation situations. There are facts listed on the pilot boarding positions in the area which should be shared knowledge.*
>
> *The VTS monitors the movements of the vessel upon a request from the pilot, if the pilot concludes that the vessel will not, in spite of instructions, manage the situation on her own. In such situations the VTS must pay special attention to the proceeding of the vessel. If the pilot deems it necessary, the pilot, the master of the vessel and the VTS can together agree that the VTS issues navigational assistance to the vessel after the pilot has disembarked the vessel and until the vessel is on a safe course.*

[34] Pilotage instruction, Helsinki 2 May 2012.

[35] Finnpilot Pilotage Ltd and VTS cooperation, the pilot boarding areas in the Sea of Bothnia area (Rauma and Pori), memorandum on 7 May 2012, supplement 22 August 2012. There is a corresponding document also for the Gulf of Finland area.

As to e.g. Rauma, the following was agreed upon:

Due to weather conditions, the pilot can board/disembark the vessel outside the pilot boarding area. The pilot informs the VTS if this is done.

- *Vessels are not requested to move inwards if the pilot has not specifically requested the VTS to do so.*
- *The VTS can request vessels to slow down if it looks like the pilot boat does not reach the vessel in time.*
- *The VTS oversees to that if the pilot transfers from the outbound vessel to the inbound vessel, the inbound vessel is not let to the Rihtniemi pilot boarding area east of the line between the Rauma lighthouse and the Reilander spar buoy before the pilot has disembarked the outbound vessel. The VTS must make sure that the vessel does not take a shortcut too early, in the proximity of the pilot boarding position, to the fairway or from the fairway because of the nearby shoals.*

5 SAFETY RECOMMENDATIONS AND OBSERVATIONS

5.1 Safety recommendations

The related safety recommendations issued in other recent investigation reports are not repeated here (see NORDLAND, C6/2010M, STADIONGRACHT, C1/2011M). The following recommendations are consequent upon this case.

The location of the fairway has in Rauma led, in order to ensure the safety of the pilot, to a procedure in which the pilot disembarks the vessel north of the fairway, before the pilot boarding area, when there are strong winds blowing from west. The VTS monitored the traffic image in accordance with its normal practice and noticed the dangerous situation too late. The VTS must be informed about atypical pilot disembarkation situations so that the VTS can monitor the vessel and make sure that it remains in the fairway long enough, past the shoals.

Due to the accident, the Sea of Bothnia VTS Centre and the pilots have agreed upon closer cooperation.

The Safety Investigation Authority recommends that:

1. *Finnpilot Pilotage Ltd and the Finnish Transport Agency in its role as the VTS authority ensure that the practices on improving cooperation between the pilots and the VTS have been adopted in the Sea of Bothnia area and that the same practice is extended to involve all Finnish pilotage areas.*

If the pilot agreed with the master prior to the voyage or in good time during the voyage on the alteration in the voyage plan and informed about the vessel's approximate position and course when disembarking, the master could anticipate any prospective navigational measures.

The Safety Investigation Authority recommends that:

2. *Finnpilot Pilotage Ltd specify its pilotage instruction in such a way that the pilot, if the pilotage ends before the pilot boarding area, understands to indicate clearly to the master the position of the vessel and the route out past the pilot boarding area and makes sure that the master has understood the aforementioned. The pilot has to notify the VTS about disembarking the vessel.*

The VTS operator in the VTS center may have to monitor several vessels in navigationally challenging areas and conditions. To enhance the operational possibilities of the VTS operator to notice hazardous operations and to prevent dangerous situations one could have automatic alarms when vessels near or surpass given boundaries. As an example the situation of this accident when the vessel went outside the fairway area twice. The VTS operator could focus on problematic cases more effectively if in the VTS centers there was automatic alarming in use when a vessel crosses a given border.

The Safety Investigation Authority recommends that:

3. *The Finnish Transport Agency determines and implements automatic alarm boundaries in the fairways at places where they are considered to improve safety*

The timing of the pilotage operation is important, especially when the pilot is transferring from one vessel to the another. In chapter 4 in the Report it has been noted how improvements in the cooperation between the pilots and VTS has been agreed on. Concerning vessels in anchorage it is possible to further specify the instructions. Now the vessels decide to depart without agreeing on it beforehand with the VTS which might impair the possibilities of the VTS to monitor the general situation. In this accident the pilot transfer operation between the inbound and outbound vessels went not in an optimal way from the point of view of safety.

The Safety Investigation Authority recommends that:

4. *The Finnish Transport Agency studies possibilities to specify the instructions of VTS given to the ships in such a way that anchored ships must ask VTS for permission before starting to move.*

5.2 Safety observations

The Safety Investigation Authority has made the following safety observation based on the PHOENIX J case.

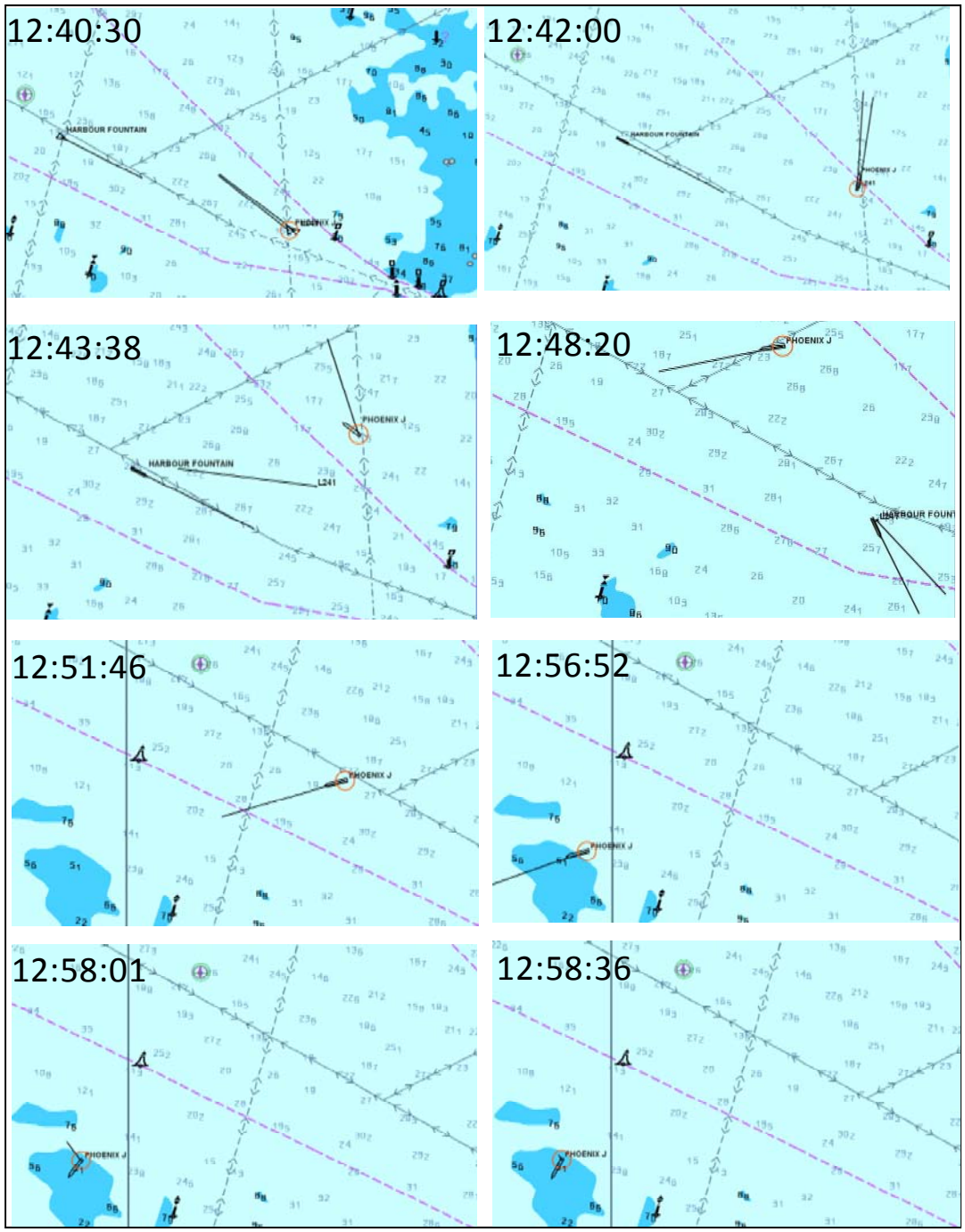
In the course of pilotage the master of the vessel may leave the manoeuvring of the vessel entirely to the pilot and does not adequately monitor the passage of the vessel. In addition, he/she has to monitor the disembarkation of the pilot to the pilot boat in which case the vessel may significantly diverge from the fairway and its direction. Therefore the exact position of the vessel may not be clear for the master when the pilot disembarks the vessel. The audits of the vessel and shipping company SMS performed by the Finnish Transport Safety Agency and the Maritime Administration of Antigua and Barbuda should ensure that the systems in question require that the master and the officer of the watch check, together with the pilot, the vessel's position and continued route before the pilot leaves the bridge.

Helsinki, 20 September 2013

Olavi Huuska Rainer Dahlblom

Appendix 1/1 (1)

POSITIONS OF VESSELS AT 12.40–12.59 ACCORDING TO THE VTS-RECORDING.



The PHOENIX J approaching the shoal based on screen prints from VTS-recording. At 12.42 the pilot boat leaves the side of the PHOENIX J. At 12.48.20 the pilot boat leaves the side of the HARBOUR FOUNTAIN. The grounding and of the PHOENIX J happened approximately at 12.58 when the vessel stopped.

SOME ACCIDENTS IN CONNECTION WITH PILOTAGE.

C2/2000M M/S AURORA, Dangerous Incident and Grounding South of Helsinki Pilot Station Harmaja on 6.3.2000

Ro-ro vessel ms AURORA owned by a Norwegian shipping company Actinor, left Helsinki Sompasaari harbour for Rauma on March 6, 2000 at 14:53. On the bridge were the master, pilot, mate and helmsman. The wind was between southeast and south with speed between 18–20 m/s.

Harmaja was passed on west side and the vessel was steered east from the south side of the pilot station so that the pilot cutter had lee on the port side of the vessel. Pilot left the vessel at 15:39. The pilot cutter got stuck on AURORA's side and could not get loose and the cutter almost capsized. The three men onboard the cutter, skipper, deckhand and pilot got into a dangerous situation. This was not noticed in AURORA before the cutter called AURORA to slow down. After being about five minutes stuck on AURORA's side, the cutter was able to get loose. The dangerous situation was caused by AURORA's drifting angle and that the pilot cutter was not looked after from the vessel.

The difficulties with the pilot cutter prevented AURORA to turn according to the plan and it got too far east from the fairway. The pilot and VTS Center gave instructions to AURORA to avoid grounding. However, AURORA grounded at Uusimatala at 15:53.

The vessel got loose with her own engine immediately. Master reported the accident to the VTS Center and to Helsinki MRSC. Coast guard vessel MERIKARHU arrived at the site at 16:40. AURORA was moored again to Helsinki West Harbour at 19:00. Oil pollution recovery vessel HYLJE took oil from one damaged tank and Finnish Maritime Authorities gave AURORA a permission to move to Turku dry dock on March 11, 2000.

C1/2008M M/S OOCL NEVSKIY, grounding south of Helsinki Pilot Station Harmaja on 27.2.2008

The M/S OOCL NEVSKIY started her voyage from Helsinki to Kotka at about 12.20 pm on 27 February 2008. The vessel was carrying 349 maritime containers. The pilot departed the vessel southwest of Helsinki Pilot Station Harmaja while she gave leeway by turning eastward in the prevailing southwesterly wind. Shortly after the pilot had departed the vessel, both the pilot and the VTS noticed that the vessel was heading towards the Uusimatala shoal. Warnings were issued and actions were taken to stop the vessel, but despite of these, the vessel ran aground at an approximate speed of seven knots.

The M/S OOCL NEVSKIY ran aground on the Uusimatala shallow. The bottom of the vessel was damaged, and there was a minor leakage in her ballast tanks. There was no oil leakage to the sea. The vessel was inspected by divers, and it was decided to delay the salvage operation until the oil recovery vessel HYLJE arrived at the scene.

The vessel was refloated from the shallow by tugs, and they assisted her back to West Harbour in Helsinki for a more thorough inspection and for reparation of the

damages in the bottom of the vessel. The M/S OOCL NEVSKIY continued her voyage to Kotka the following evening.

The cause of the accident was human error in navigation.

C3/2008M M/S ANNE SIBUM, grounding near Tainio Lighthouse on 2 April 2008

On 2 April 2008 M/S ANNE SIBUM was on a voyage from the port of Kotka to Germany and at 13:53, south of Orrengrund, the pilot disembarked. After having landed the pilot the master handed over the con of the ship to the Officer of the Watch (OOW). The vessel continued on the course 237.5°. However, after the next turn it passed over a shoal at 60°14.255'N, 026°24.160'E and, at 13:58, ran aground. The vessel reduced speed, turned back to the fairway and continued its voyage as the crew began to assess the damage.

No leaks were detected and because, in spite of the damage, the manoeuvring equipment and the thrusters worked well enough, the master decided to continue the voyage. He notified the shipping company of the event. However, he failed to inform the Finnish authorities. While the location of the grounding is within the area of Kotka VTS, they did not notice the fact that the vessel had been outside the fairway.

The accident was caused by an error in navigation. Inadequate bridge team resource management can be considered as a contributing factor.

C1/2000M M/S OCEAN PRIDE, grounding at Orrengrund 6.3.2000

The Norwegian cargo vessel OCEAN PRIDE owned by the Pride-Petrus Company grounded in the Finnish archipelago at Orrengrund in the evening of the 6th of March 2000. The vessel was registered at the Norwegian NIS register and had a seven member multinational crew. The vessel was bound for Kotka from Ventspils.

A southerly storm was prevailing in the Orrengrund area with gusts up to 24 m/s. The visibility was poor. The master got the advice to proceed to an unofficial pilot boarding place at the western tip of the Orrengrund island. The master regarded this as an order and followed it. When the mate left the bridge to pick up the pilot the master was left alone on the bridge.

Slightly before the official pilot boarding place the master turned to port with the autopilot to heading 000 towards the western tip of the Orrengrund Island. Next, he tried to turn with the autopilot further to port to heading 340 with the intention to round the west shore of the Orren-grund island, but the steering gear did not react. He switched to manual but the steering gear did not obey his orders. He tried the autopilot again and manual steering the second time in vain. The steering gear did not respond. The Master's next move was to turn the emergency steering wheel to port. The steering gear responded but slowly. The vessel was already too close to the shore and stranding could not be avoided. The Master's last operational measures aimed to limit the consequences of the grounding. The imminent causes of the accident were the storm, bad visibility, steering gear failure and poor manual steering system.

The investigation found several hidden latent errors with regard to the vessel. The master did not know the procedures related to the unofficial pilot boarding place. He was not aware of the fact that the VTS centre will not provide steering commands for reaching the new pilot boarding place.

The previous master had requested an increase in the manning for the Baltic traffic but the company had not agreed. The small manning led to a situation were the master had to violate the STCW rules for fitness on duty for his own part. The master was alone and there was not a one-man navigation and steering point. He had to navigate with the radar in poor visibility and he had to steer simultaneously. The master had to deviate from his original passage plan. This situation would have required accurate steering commands by the pilot organisation but the master did not get the information he needed.

C5/2009M M/S EMSRUNNER, grounding off Kalajoki on 11 December 2009

Cyprus flagged M/V EMSRUNNER arrived in ballast from Sweden to load peat in port of Rahja at Kalajoki in Finland. After taking the pilot on Kalajoki pilot boarding place the vessel grounded under pilotage, outside of fairway area, into the shoal of Välimatala.

The vessel got tears to the bow ballast tank to her port side, dents to the fore peak area, tears to the bilge keel and some dents to bottom plates on starboard side. Furthermore there were some damages in the bow thruster room. There were no leakages or environmental damages.

After investigations performed in the harbour by the Maritime authority and classification society, installation of an additional pump into the bow thruster room and giving the detailed casualty report, the vessel got the permission to sail to repair shipyard in Estonia, where the damages were repaired.

C1/2011M M/S STADIONGRACHT (NL), grounding off Rauma on 29th December 2010

The Dutch-flagged M/V STADIONGRACHT ran aground in the 10.0 metre-deep southern fairway to Rauma at 00.15 on 29th December 2010. The grounding occurred in a position which is approximately 2.7 miles (5 kilometres) from the pilot boarding position in the direction to the port. A nine-metre shoal indicated by a lateral spar buoy is located in the area.

The STADIONGRACHT was just about to finish her voyage from Kotka to Rauma. She was carrying kaolin. After passing the pilot boarding position south of the Rauma lighthouse, the vessel proceeded towards the beginning of the 10.0 metre navigation line so that the Pilot could embark her. The Pilot was onboard VECHTDIEP and was coming to meet the STADIONGRACHT. A pilot cutter was waiting in the fairway in order to transfer the pilot from one vessel to the other.

The operator of the West Coast VTS had informed the STADIONGRACHT that the Pilot was coming to meet her and further that the pilot cutter was on her way. The STADIONGRACHT passed the pilot cutter and the outpiloted vessel and proceeded without stopping towards the tapering part of the fairway. The Pilot saw the situation from the VECHTDIEP and contacted the VTS-operator by his mobile

phone. The VTS-operator immediately called the STADIONGRACHT on a radio telephone and recommended that the vessel turn and wait for the pilot. The message was acknowledged by the STADIONGRACHT and she started a turn via port. During the turn the vessel ran aground and stopped.

The bottom of the STADIONGRACHT was seriously damaged, especially where the ballast tanks were located. There were no damages to persons or the environment.

It was found out in the investigation that the turn was made via port because the Master had various reasons to consider this direction better. The VTS-operator did not interfere with the turning direction of the vessel.

The STADIONGRACHT was manoeuvred past the pilot boarding position because the communication and the observation of the pilot cutter had led to the misconception that the Pilot was waiting onboard the pilot cutter and was going to board the STADIONGRACHT later, after the pilot boarding position.

It was found out in the investigation that the practice with reference to the pilot boarding positions is wide-ranging: passing the pilot boarding position and boarding the vessel later is not that unusual. The communication preceding the course of events between the VTS, the vessel and the Pilot was scarce and made misinterpretations possible.

The VTS has a high threshold to interfere with the navigating of vessels even in unusual circumstances.

The Safety Investigation Authority made three recommendations. It was recommended that the Maritime Department at the Finnish Transport Agency increased the efficiency of VTS operators' training thus aiming at encouraging operators to use their full authority. The Finnish Transport Safety Agency was recommended to increase the status of pilot boarding positions: according to the law, the pilot can board/disembark a vessel elsewhere than at a pilot boarding position only in exceptional circumstances. Finnpilot Pilotage Ltd was recommended to draw clear instructions to pilots on the commencement and ending of pilotage by always using standard messages.

Finnpilot Pilotage Ltd and the Maritime Department at the Finnish Transport Agency have launched a joint project in order to create common working practices and make the communication of the actors more effective, which is to be regarded as a very necessary project.

C6/2010M M/S NORDLAND (NLD), Grounding in the Archipelago Sea on 13 October 2010

On 12 October 2010 at 22:30 the Netherlands-flagged MS NORDLAND, in ballast condition, departed Turku for Pietarsaari. The master, a pilot and a lookout were on the bridge. However, immediately prior to the accident the lookout was not on the bridge. The ship's joystick hand steering was used as the vessel cast off and only later, on the fairway, was the ship's autopilot switched on. The pilot used the ship's only radar. No suitable electronic navigational charts for the voyage were available.

While the pilot independently steered the vessel the master monitored the passage on his own computer and paper chart. This was done in complete silence. No communication ensued when the vessel approached wheel over points (WOP). The pilot kept adjusting the course without informing the master of his decisions.

Upon approaching the Rönngrund narrows the course over ground (COG) was 268°. At 00:02, abeam of Östra Långgrundet island, 0.25 NM from it, the pilot first set the autopilot heading to 300°, followed by 324° and then 335°. When he noticed that the turn could not be completed as he had planned, and that the radar return of the east spar buoy was lost in sea-clutter, he requested the use of hand steering. By the light of a torch the master located the rudder control button and engaged the joystick hand steering, which the pilot then commenced to use. At this point the vessel was in the red sector of Rönngrund, on a 310° COG. The pilot turned the rudder 20° to starboard, which increased the rate of turn (ROT) to 54°/min. Soon after this the pilot placed the rudder amidships. Right then, at 0:07 and at the heading of 338°, the vessel ran aground between Paukut and Hopialuoto islands at 60°16.2'N 021°47.2'E.

The inaccuracy of ships positioning in mid-turn contributed to the accident. Other contributing factors included inadequate bridge team resource management and steering, as far as dividing the turn into three segments is concerned, as well as unsuitable autopilot settings for navigating in the archipelago. Unsatisfactory application of the vessel's Safety Management System (SMS) at the practical level is considered to be the root cause of the accident.

Lessons learned. A properly prepared safety management system per se does not render a sound system. Its usefulness also relies on effective practical implementations as well as frequent reviews. Meticulous voyage planning, an elemental issue, also deserves to mentioning. This includes a clear delegation of responsibilities for the voyage. It is imperative that the bridge team share a common view of the steering inputs which are required during the voyage.

Safety Investigation Authority, Finland recommends that the shipping company and Finnpilot Pilotage Ltd take prompt action in applying bridge resource management in such a manner that the ship's crew and the pilot share a common view on the voyage plan and its implementation as well as the use of steering controls and the steering manoeuvres to be executed. Another recommendation is given to shipping company to take action which brings the port side radar and the electronic chart system up to par with the navigational requirements of the archipelago.

M/S BARENTSZDIEP (NLD), collision with the edge mark off Oulu on 10.1.2012

M/S BARENTSZDIEP was laden with timber when she departed Oulu at 4.00 on 10 January 2012. The voyage plan was not gone through prior to the voyage and the Pilot did not present his own plan to the Master. The Master took care of turning the vessel in the dock basin. After the vessel had been turned, the Pilot took over the manoeuvring. To start with, he used manual rudder and later on in the fairway he switched over to automatic steering. During the voyage the pilot

boarding area was changed from a northerly location to a more southern location near Holma upon a request made by pilot. The VTS was not aware of this change.

The pilot boat came to the side of the vessel as early as 3 NM before the southern pilot boarding area, but it suffered from problems in staying there because of the west-south-westerly swell. The Pilot was down on the deck; however, he could not transfer to the pilot boat because of the abovementioned reasons. The Master was alone on the bridge and the vessel was on automatic steering, which can only be operated from the middle console of the bridge. At the time of the accident, the Master was mainly on the port bridge wing because of the departure of the Pilot. The Pilot asked the Master to turn the vessel on a more southerly course of 190°–180°. This change of heading did not provide enough lee for the pilot boat so the Pilot requested a turn on course 160°. After the vessel had turned on this course, the Pilot was able to board the pilot boat at approx. 7.30. The vessel continued turning after that and reached the heading of 152.8°.

The Master was fully concentrated on the safe departure of the Pilot, and he did not at that instant notice that the vessel had proceeded close to the Holma edge mark. The Pilot warned the Master about the proximity of the Holma edge mark from onboard the pilot boat as did the deckhands who were on the deck. It is worth noticing that the accident occurred when it was dark but that the edge mark was lit with a white flashlight and that there was no lookout on the bridge. The deck illumination used in connection of the departure of the Pilot reduced possibilities to make observations. The Master saw the edge mark on the port side approx. 20–30° and 2–3 cables from the bow. The Master steered to starboard by using automatic steering when the speed was according to the S-VDR approx. 4.2 knots. As the vessel was fully laden, she did not turn as was hoped and collided with the edge mark port side first at 7.31.

So many duties had built up on the Master that he was not able to manage them alone. These duties encompassed the control of the vessel’s motion state including speed control, use of autopilot, monitoring of the heading, outlook, monitoring of the radar and communication with the Pilot as well as observing what was happening on the deck. The modification of the voyage plan upon the Pilot’s request and the manoeuvring orders given by the Pilot from the deck level can be considered as contributing factors.

The bridge must always be appropriately manned to ensure the safe navigating of the vessel in all circumstances. Pilot boarding/disembarking must be realised in such a way that the vessel has enough berth to provide lee for the pilot boat and to return back on a safe course.

As a result of the investigation, the Safety Investigation Authority recommends to the Finnish Transport Agency and the Finnish Meteorological Institute that they let install such appliances to the safety equipment that it is possible for seafarers to access real time information on the state of sea on the pilot boarding area and in its immediate proximity. In addition, the Safety Investigation Authority recommends to Finnpilot Pilotage Ltd and the Finnish Transport Agency that they, after the collaboration meetings of all pilotage areas in the entire country have been held, compile a common operating instruction for the VTS centres and pilots.

TraFi Liikenteen turvallisuusvirasto
Trafiksäkerhetsverket

Lausunto

Päiväys/Datum 19.8.2013

Dnro/Dnr TRAFI/10746/07.01.00/2012

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Onnettomuustutkintakeskus
Jussi Pöyhönen
Ratapihantie 9
00520 Helsinki

Liikenteen turvallisuusviraston lausunto tutkimusselostuksen luonnoksesta M2012-02 "M/S PHOENIX J (ATG) karilleajo Rauman edustalla 18.4.2012"

Liikenteen turvallisuusvirasto Trafi on tutustunut lähettämäänne tutkinta-selostuksen luonnokseen ja käyttää mahdollisuuden antaa luonnoksesta lausunto.

Liikenteen turvallisuusvirasto lausuu tutkintaselostuksen luonnoksesta seuraavaa: Tutkintaselostuksessa on kuvattu kyseisen tapahtuman kulku ja todennäköinen syy onnettomuuteen hyvin seikkaperäisesti saatavilla olevien tietojen perusteella. Liikenteen turvallisuusvirasto yhtyy tutkintaselostuksessa mainittuihin johto-päätöksiin. Liikenteen turvallisuusvirasto haluaa erityisesti painottaa, että aluksen päällikkö on aina vastuussa aluksen sijainnista ja aluksen käsittelystä kaikissa tilanteissa huolimatta siitä, onko aluksessa luotsi tai onko luotsi jättämässä aluksen. Tässä tapauksessa päällikön komentosiltayhteistyöskentely ja merimies-taidot voidaan kyseenalaistaa.
Liikenteen turvallisuusviraston tarkastajalle päällikkö oli ilmoittanut onnettomuuden välittömäksi aiheuttajaksi ylikuormittumisensa komentosillalle samanaikaisesti monien eri kommunikointilaitteiden kautta tulevien kutsujen ja soittojen takia. VHF-puhelin, GSM-puhelin ja aluksen sisäisellä puhelimella tullut soitto kone-huoneesta olivat vaatineet hänen huomionsa, jolloin navigointiin vaadittava huomio herpaantui.

Komentosiltatyöskentelyssä on syytä ylläpitää hyvää turvallisuuskulttuuria sekä kiinnittää erityistä huomiota siihen, että myös päällikkö noudattaa turvallista komentosiltayhteistyötä ja delegoi tehtäviä siten, että ylikuormittumistilannetta ei pääse syntymään.

Liikenteen turvallisuusvirastolle osoitetuista turvallisuushavainnosta haluamme lausua seuraavaa:

1. *"Liikenteen turvallisuusviraston ja Antigua Barbudan merenkulkuhallinnon tekemissä alusten ja varustamoiden SMS-järjestelmien auditoinneissa pitäisi varmistaa, että kyseisissä suunnitelmissa edellytetään päällikön ja vahtipäällikön tarkistavan luotsin kanssa aluksen sijainnin ja jakoreitin ennen luotsin poistumista komentosillalta."*

Varustamoiden ja alusten turvallisuusjohtamisjärjestelmien säännöllisten tarkastuksien yhteydessä arvioidaan muun muassa varustamoiden aluksille antamat aluskohtaiset ohjeistukset. ISM-koodi on toisaalta laajasanaisesti laadittu säännöstö,

joka antaa varustamoille/yhtiöille mahdollisuuden itsenäisesti laatia suunnitelmia ja sellaisia turvallisuusohjeita, joiden he katsovat olevan riittäviä.

Lippuvaltiot voivat toki antaa suosituksia tarkennetuille ohjeistuksille, mutta eivät voi edellyttää seikkaperäisiä ohjeita, jotka eivät selkeästi kuulu ISM-koodin vaatimuksiin.

Huomioitava on myös, että sekä PHONEIX J:n että alusta operoivan ISM-yhtiön oli auditoinut Germanischer Lloyd[1] ja sen valossa turvallisuushavainto olisi syytä ensisijassa kohdistaa kyseiselle luokituslaitokselle.

Tutkintaselostuksessa havaittiin myös pieniä epäkohtia, joita on kommentoitu tarkemmin erillisellä liitteellä.

Lopuksi haluamme todeta, että mahdollisista Liikenteen turvallisuusviraston lisätoimenpiteistä koskien turvallisuushavaintoja päätetään erikseen.

Tuomas Routa
Ylijohtaja

[1] Ks. kohta 1.5.3 Laatujärjestelmät (s. 21).

FINNPILOT

Onnettomuustutkintakeskus
Ratapihantie 9
00520 Helsinki

FINNPILOT PILOTAGE Oy:n LAUSUNTO M/S PHOENIX J:n KARILLEAJON 18.4.2012 TUTKINNASTA

Onnettomuustutkintakeskus (OTKES) on tutkinut M/S Phoenix J:n karilleajoa Rauman edustalla 18.4.2012 ja pyytänyt tutkintaselostusluonnoksesta lausuntoa Finnpilot Pilotage Oy:ltä (Finnpilot) 2.8.2013 tulleella sähköpostilla. Lausuntonaan Finnpilot toteaa seuraavaa.

Tutkimuksen tuloksena OTKES katsoo, että onnettomuuden välitön aiheuttaja oli inhimillinen erehdys, kun päällikkö ohjasi aluksen väärään suuntaan päätyen karille. Finnpilot on tästä johtopäätelmästä samaa mieltä. Ennen tätä inhimillistä erehdystä on tapahtunut lukuisia asioita joita on syytä tarkastella lähemmin.

Sivulla seitsemän, kolmannessa kappaleessa todetaan, että "luotsi otti Phoenix J:n ohjattavakseen". Finnpilotin mielestä olisi oikeampaa sanoa, että luotsi luotsasi käyttäen aluksen laitteita. Tällöin kirjoitusasu olisi linjassa sen kanssa, mitä Liikenteen turvallisuusvirasto (Trafi) on lausunut luotsauksesta lausunnossaan 22.8.2011 (Komentosiltalaitteiden käyttö luotsauksessa, Trafi/14290/03.04.01.02/2011).

Sivuilla 19 ja 23 OTKES toteaa, että luotsaus ja VTS ovat eri organisaatioissa ja niiden yhteistyö ei ole itsestään selvää. Tämä pitää paikkansa jonka vuoksi on laadittu yhteistyöhön ohjaavia ohjeita VTS:n ja luotsauksen välille. Lisäksi Finnpilot on esittänyt luotsauksen ja VTS:n organisaatioiden yhdistämistä, mikä loisi parhaat edellytykset meriturvallisuuden kehittämiseksi.

Tutkintaselostusluonnoksessa käsitellään useaan otteeseen luotsin poisjääntiä ennen luotsipaikkaa. Lisäksi todetaan käytännöksi muodostuneen jäädä vaikeissa sääolosuhteissa ennen luotsipaikkaa pois ja nyt tässä tapauksessa jäätiin pois ennen tuota käytännöksi muodostunutta paikkaa. Tutkintaselostusluonnos aivan oikein kertoo, että luotsilla on oikeus jäädä pois muussakin luotsipaikalla, mikäli sää- tai jääolosuhteet sitä edellyttävät ja asiasta on sovittu aluksen päällikön kanssa, lisäksi VTS:lle tulee näistä asioista kertoa. Tässä tapauksessa luotsi menetteli juuri niin kuin pitää ja mihin hänellä on oikeus. Luotsi suunnitteli jo aluksen lähtövaiheessa, että hän tulee jäämään aiemmin pois aluksesta, johtuen sääolosuhteista. Tämä suunnitelma käytiin läpi aluksen päällikön ja VTS:n kanssa. Mikäli Harbour Fountain olisi ollut luotsipaikan tasalla sovittuna aikana, eikä seitsemän minuuttia liian aikaisin, olisi vaihto aluksesta toiseen voitu toteuttaa suunnitellusti luotsipaikan läheisyydessä. Harbour Fountainin sisääntuloon olisi VTS:n pitänyt puuttua aktiivisesti ja ohjata liikennettä (Alusliikennepalvelulaki 7§, 1. mom.), eikä vain seurata sitä kuten tutkimusselostuksessa useasti mainitaan.

Luotsin ja päällikön tiedonvaihtoa luotsin poistuessa käsitellään tutkintaselostusluonnoksen sivulla 25. Tuossa yhteydessä mainitaan, että uusi suunta ja reitti takaisin väylälle jäi näyttämättä päällikölle. Toisaalta sanotaan, että luotsi näytti päällikölle aluksen sijainnin ja kysyi, että onko kaikki kunnossa. Luotsi sai vastauksen, että kaikki on kunnossa. Tarkan suunnan antaminen ennen poislähtöä ei ole täysin mahdollista, koska luotsi ei voi tietää miten päällikkö loppujen lopuksi leen antamisen toteuttaa ja mikä on aluksen tarkka sijainti tämän operaation

Finnpilot Pilotage Oy
Kansakoulukuja 3
PL 520, 00101 Helsinki
Tel 0207 54 611
Y-tunnus 2375854-3

Finnpilot Pilotage Ltd
Kansakoulukuja 3
P.O. Box 520, FI-00101 Helsinki, Finland
Tel 0207 54 611
Business ID 2375854-3

www.finnpilot.fi

Appendix 3/4 (8)

jälkeen. Finnpilot kuitenkin tulee suunnittelemaan, miten päällikköä voidaan tukea aluksen turvallisen kulun varmistamisessa myös sen jälkeen kun luotsi on aluksesta poistunut.

Sivulla 26, kolmannessa kappaleessa käsitellään sitä, että alusliikenneohjaaja keskittyi seuraamaan Harbour Fountainin lähestymistä väylän kapealle osuudelle ja tässä yhteydessä alusliikenneohjaaja menetti välittömän näkymän Phoenix J:in. On ymmärrettävää, että alusliikenneohjaaja menetteli näin, mutta samalla tapaus paljastaa ihmisen rajoittuneisuuden. Ihminen pystyy aidosti seuraamaan ainoastaan yhtä tapausta kerrallaan korkeatasoisesti. Suomen VTS-alueilla liikkuu kuitenkin useita, ellei jopa, useita kymmeniä, aluksia samanaikaisesti yhtä alusliikenneohjaajaa kohden. Nykyisellä VTS:n toimintamallilla ei ole mahdollista seurata kaikkia aluksia riittävällä tasolla. Nopea ratkaisu, joka osaltaan parantaisi merkittävästi tilannetta ja olisi voinut estää Phoenix J:n karilleajon on se, että VTS-keskuksissa otettaisiin laajasti käyttöön automaattiset hälytykset (jotka jo ovat olemassa VTS:n käyttämässä järjestelmässä), kun alus ylittää tietyn rajan. Näitä rajoja tuli piirtää kaikkien kauppamerenkulkijoiden käyttämien väylien ulkopäihin ja lisäksi muihin kriittisiin kohtiin. Tällöin alusliikenneohjaajien aika kohdistuisi paremmin niihin tapauksiin joihin tarvitaan ihmisen tulkintaa ja järjestelmä valvoisi rutiinitapahtumat. Tässä tapauksessa olisi saatu noin kolme minuuttia enemmän aikaa varoittaa Phoenix J:tä, jos varoitus olisi annettu silloin kun Phoenix J ylitti rasteroidun alueen reunan, tämä olisi todennäköisesti estänyt onnettomuuden synnyn.

Sivun 26 lopussa, viimeisessä kappaleessa, käsitellään luotsien aluksista poisjääntejä, jonka todetaan olevan poikkeustilanteissa (tarkoittaa sää- tai jääolosuhteita) lainmukaista. Kappaleeseen on kuitenkin liitetty lainaus (Sidney Dekker), jonka tarkoituksena on ilmeisesti vihjata siihen suuntaan, että ulosmenevästä aluksesta sisääntulevaan alukseen vaihdetaan erityisesti sen vuoksi, että siitä saadaan taloudellista etua. Taloudellista etua ei tällä menettelyllä (sama luotsi hoitaa sisään menevän ja ulostulevan) ole saavutettavissa, mutta sen sijaan tällä menettelyllä voidaan edistää sitä, että luotsit ovat mahdollisimman hyvin levänneet ennen luotsaustehtävää. Käytännön esimerkkinä voi toimia asema, jossa on vuorossa viisi luotsia ja yön aikana olisi esimerkiksi viisi luotsausta. Onko järkevää levon kannalta herättää jokainen luotsi tekemään puolitoista tuntia työtä vai kannattaako herättää ainoastaan kaksi tai kolme, jos he ehtivät hoitaa nämä luotsaukset ns. tuplaluotsauksina (= sama luotsi hoitaa sisään menevän ja ulostulevan)? Tällöin kaksi tai kolme luotsia saa levätä koko yön ja unen tällöin taso aivan toista verrattuna siihen, että kävisi tekemässä yhden lyhyen luotsauksen, jolloin se yö on jo auttamatta pilalla unensaannin näkökulmasta. Molemmilla tavoilla päästään siihen, että laki- yms. sääteiset lepoajat toteutuvat, mutta levon laadullakin on merkityksensä ja sitä tällä menettelyllä haetaan Finnpilotissa. Sisään tulevan ja ulosmenevän aluksen luotsaaminen peräkkäin saman luotsin toimesta on täysin mahdollista järjestää turvallisesti, kunhan tieto kulkee eri organisaatioiden (VTS, luotsi, alus/alukset) välillä riittävän saumattomasti. Saumattomaan tiedonvaihtoon pyritään nyt VTS:n ja Finnpilotin välisin ohjeistuksin, mutta luonnollisesti vieläkin parempi olisi, jos luotsaus ja VTS toimisivat saman johdon alaisina, kuten ennen vuotta 2004.

Liitteessä yksi todetaan, että luotsauksen vastuuviranomainen Suomessa on Liikenteen turvallisuusviraston luotsauksen viranomaisyksikkö. Asia ei ole näin, luotsauksen vastuuviranomainen on Liikenteen turvallisuusvirasto ja luotsauksen viranomaistehtävät ovat siellä jakaantuneet usealle toimialalle. Luotsausasioita Trafissa hoitavat ainakin seuraavat toimialat; Sääntely ja kehittäminen, Luvat ja hyväksynnät ja Valvonta.

Sivulla 27, neljännessä kappaleessa mainitaan aiemmista onnettomuuksista, jotka ovat tapahtuneet luotsin oton/jätön yhteydessä. Näitä onnettomuuskuvauksia löytyy noin seitsemän sivun verran liitteestä kolme. Ajanjakso kuvattujen onnettomuuksien välillä on vuodesta 2000 vuoteen 2012. Finnpilotin mielestä olisi kohtuullista

mainita, että kyseisen ajanjakson aikana on toteutettu Suomessa varovaisen arvion mukaan noin 400 000 luotsausta. Luku antaa hiukan perspektiiviä siitä kuinka usein luotsin oton/jätön yhteydessä onnettomuus on viimeisten vuosien aikana tapahtunut, tällaisenaan liitteen esittäminen vaikuttaa siltä, että lukijalta halutaan piilottaa oleellista tietoa joka johtaa siihen, että tutkintaselostusluonnoksen tekijöiden asenteellisuus luotsausta kohtaan voidaan kyseenalaistaa, mikä taas ei ole meriturvallisuustyölle eduksi. Toinen vaihtoehto on, että kyseinen liite poistetaan kokonaan tutkintaselostuksesta.

Liitteessä neljä pohditaan luotsin ottoon ja jättöön liittyvää problematiikkaa. Tämän liitteen kolmannessa kappaleessa esitetään suoraan se ajatus, joka varsinaisessa tutkintaselostuksessa oli sivulla 26 ilmaistu Sidney Dekkerin lainauksena. Finnpilot viittaa tässä yhteydessä edellä esittämäänsä eli tuplaluotsauksella ei tavoitella taloudellista etua tai tehokkuutta, vaan sillä tavoitellaan mahdollisimman levänneitä luotseja luotsauksiin. Liitteen neljä sivulla kaksi, neljännessä kappaleessa käsitellään luotsin kutsumista VHF-puhelimella. Finnpilotilla on nyt mahdollisuus kuunnella VHF-kanavia luotsinvälityskeskuksessa ja käyttää Liikenneviraston VHF-tukiasemaverkostoa kommunikointiin alusten kanssa. Teknisesti tämä toteutettiin keväällä 2013 ja loppuvuodesta se tulee operatiiviseen käyttöön. Ennen operatiivista käyttöönottoa Finnpilotin tulee tiedottaa mahdollisista uusista menettelyistä asiakkaille ja luoda sujuvat menettelyt VHF:n käytölle. Liitteen neljä sivulla kaksi, viidennessä kappaleessa todetaan liikennetilanteen olevan näkyvissä VTS:ssä ja luotsinvälityskeskuksissa AIS:n avulla. Tämä pitää paikkansa, mutta tähän voisi lisätä sen, että lisäksi VTS näkee miten luotsausjärjestelyt on suunniteltu luotsinvälityskeskuksessa, koska VTS:llä on näkymä Finnpilotin toiminnanohjausjärjestelmään (=Pilotweb), josta näkee mm. sen onko jokin tapahtuma suunniteltu esimerkiksi ns. tuplaluotsaukseksi.

Johtopäätökset tutkinnasta on listattu sivulle 28. Johtopäätökset numeroilla kaksi ja kolme poissulkevat toinen toisensa. Ensin (johtopäätös numero kaksi) todetaan, että luotsipaikalle ei voitu mennä ja sitten annetaan ymmärtää, että olisi nyt kuitenkin pitänyt mennä. Johtopäätös numero 11 ei täysin vastaa Finnpilotin käsitystä alusliikenneohjaajan tehtävistä. Jokaista alusta VTS-alueella tulee seurata, tässä tulee ottaa tekniikkaa apuun, mikäli alusliikenneohjaaja ei kaikkea ehdi seurata.

Turvallisuussuositukset ja turvallisuushavainnot on kirjattu sivuille 31 ja 32. Suositus numero yksi on realistinen ja meriturvallisuutta edistävä. Tätä suositusta on jo lähdetty toteuttamaan ja ohjeistus tulee kattamaan koko Suomen rannikon tämän vuoden kuluessa.

Suositus numero kahden luotsausohjeeseen vienti on realistinen tavoite. Ongelma suosituksessa numero kaksi on se, että kuinka luotsi voi ”varmistaa päällikön ymmärtäneen”. Täyttä varmuutta ei tulla koskaan saamaan, jo pelkästään se, että poisjääntiä saatetaan puida pimeällä komentosillalla ja päällikön kielitaito voi olla mitä vaan, asettaa rajoitteita varmistua päällikön ymmärtämisestä.

Lisäksi voisi olla suositus numero kolme, jossa suositettaisiin Liikennevirastoa ottamaan käyttöön automaattiset hälytysalueet sisääntuloväylien varrella/päissä ja muuallakin, missä niillä voidaan katsoa olevan hyötyä.

Suositus numero neljä olisi Liikennevirastolle suositus siitä, että se selvittäisi mahdollisuuden vaatia ankkurissa olevalta alukselta liikkeellelähtölupa –pyynnön. Nykyisellään alukset antavat ankkurista lähtiessään ilmoituksen (West Coast VTS:n Mastrs guide. Liikenteen ohjaamiseksi, mikä on VTS:n tehtävä, olisi tehokkaampaa, jos aluksen pitäisi pyytää lupa lähteä liikkeelle ankkurista, ei vain ilmoittaa, että liikkeellä ollaan.

Appendix 3/6 (8)

M/S Nordlandin tutkimuksesta lausuessaan (27.8.2012) Finnpilot esitti, että komentosiltayhteistyön kehittämisestä tehtäisiin kansallinen hanke. Finnpilot toistaa esityksensä tästä asiasta ja on halukas osaltaan edistämään turvallisten komentosiltakäytäntöjen eteenpäinvientiä merenkulussa Suomessa ja kansainvälisesti.

Onnettomuustutkintakeskus on viimeisessä merenkulun tutkimuksessaan ottanut tavan, että lausuntoja ei enää julkaista, vaan julkaistaan ainoastaan yhteenvedot niistä. Finnpilot ei pidä hyvänä tällaista kehitystä, koska jokaisella kerralla kun Finnpilot on jostakin onnettomuudesta lausunut, niin Finnpilotilla on ollut tuoda jotakin uutta tietoa, mitä tutkintaselostuksesta ei löydy, niin on tälläkin kertaa. Onnettomuustutkintakeskuksen selostuksia usein referoidaan julkisuudessa, ja jos ne ovat sisällöltään puutteellisia, ei lukijoille voi syntyä objektiivista näkemystä esitetyistä asioista. Mikäli puutteellisuuksia julkaistavassa materiaalissa esiintyy, on Finnpilot pakotettu harkitsemaan sitä, että se itse julkaisee samaan aikaan omat lausuntonsa ko. tutkinnasta. Onko tämä sitten se mitä OTKES haluaa, jää OTKESin harkittavaksi.

Lopuksi Finnpilot toteaa omana näkemyksenään, että nyt tutkittu onnettomuus syntyi aluksen päällikön virheen johdosta. Erityisen valitettavaa on, että päällikköä vielä neuvoi luotsin lisäksi hänen oma yliperämiehensä ottamaan turvallisen kurssin, mutta hän ei tästä piitannut. Alueella jossa karilleajo tapahtui, olisi ollut erittäin helppoa paikantaa itsensä, koska aluksen välittömässä läheisyydessä on mm. Rauman majakka. Päällikön toiminta vaikuttaa siten piittaamattomalta ja suuripiirteiseltä. Tällainen asenne ei sovellu turvalliseen merenkulkuun ja varustamon tulisikin vetää omat johtopäätöksensä.

Helsingissä 21.8.2013

Luotsausjohtaja Kari Kosonen, Finnpilot Pilotage Oy

JÜNGERHANS
MARITIME SERVICES
GMBH & CO. KG

Jüngerhans Maritime Services · P.O.Box 12 60 · D-49724 Haren (Ems)

Finnish Transport Safety Agency
Northern Inspection Unit
P.O.Box 31
FI-65101 Vaasa

Lisa Schepers
Phone (+49) (0) 5932 72 50-0
Fax (+49) (0) 5932 72 50-60
E-Mail info@juengerhans.de
Internet www.juengerhans.de

Finland

Haren (Ems), 13 June 2012

MV "PHOENIX J" / Maritime Declaration / Ind.No.: TRAFI/7091/07.01.00/2012

Dear Sir or Madam,

Please be informed that our crewing agency Marlow Navigation passed the document "Request for a Maritime Declaration" to the Master of the MV "PHOENIX J".

In all probability we will come back to you next week regarding the information, to when and where the Master´s Declaration is scheduled to take place.

Kind regards,

Jüngerhans Maritime Services GmbH & Co. KG

i. A.
Lisa Schepers

Appendix 3/8 (8)

Dear Colleagues,

We have analyzed your draft report and found it sound and precise. All relevant facts leading to the grounding have been dealt with and the safety issues meet our opinion.

However, there are some minor questions and corrections which we like to bring to your attention.

1. Events & Investigation Part 1.1.1.1 – Nationality – replace by Flag State
2. There is a conflicting description about entering the course into the radar and not ECDIS is the system on board ECS only as the voyage plan has been compiled in table form and entered into paper charts?
3. Page 17 § 1.2.8 S-VDR data have not been provided? Why not, we could have been of assistance, but were never consulted and thus were not aware of the uncooperative shipping company.
4. Picture of vessel's bottom – we have a variety of pictures, taken directly when the vessel was dry docked in Bremerhaven. We would be more than willing to provide them. They give a clear picture of the damage to the ship's bottom.
5. Organizations 1.4.4 – stating that the flag state is the primary organ supervising the vessel and its operations.
   This statement is wrong and could be a translation bug.
   The Flag state monitors the Company and its ships to ensure compliance to all international rules, regulations and conventions.

We thank you for your kind cooperation.

Kind regards
Anika Schmidt on behalf of

Capt. Siegfried Ottinger
Chief Casualty Investigator on behalf of
ADOMS – Department of Marine Services
and Merchant Shipping – Antigua and Barbuda W.I.
Inspection and Investigation Division

Steubenstrasse 7b
D-27568 Bremerhaven/Germany